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SQUARE FEET | SPOTLIGHT

Wireless Workplaces, Touching the Sky

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Hiroko Masuike for The New York Times

Brian Schwagerl, left, and Charles Montplaisir showed off some wireless connections inside the Hearst Tower, which opened its doors a year ago.

The Hearst Tower in Midtown Manhattan is known for its environmentally friendly features, along with its stunning design by the British architect Norman Foster. A distinctive triangular structure of glass and steel, it rises from the shell of the original six-story sandstone headquarters erected by William Randolph Hearst in 1928.

But the tower — which opened a year ago near Columbus Circle and received a "gold" certification for sustainability from the United States Green Building Council — is also one of the more technologically advanced office buildings in the country. Almost everything is automated, from the lighting to the two-story waterfall in the lobby. Employees and visitors can also use their cellphones, BlackBerrys and wireless laptops anywhere in the building's 46 floors, including the lobby and cafe. Employees have access to all the applications and network services they would have if they were sitting at their desks.

At first glance, that may not seem a big deal. Yet in many office towers — as many people who've tried to get a cellphone signal on upper floors can attest — heavy construction materials impede radio frequency signals, resulting in weak signal coverage in parts or all of a building. To compensate, many buildings have sprouted a costly tangle of antennas and cables for the various devices, which use different wireless technology standards and spectrum bands. But that can create interference and the headache of installing cables and antenna for each new service.

Charles Montplaisir, the vice president for information systems at the Hearst Corporation, said wireless access was an important design point from the beginning. "I couldn't imagine building a building today without a fully ubiquitous wireless network," he said.

A growing number of other companies and organizations appear to agree. Wireless connectivity has become a must-have amenity for businesses, hotels, hospitals, sporting arenas and other public and private buildings.

"Wireless is the way things are moving," said Mark Feller, the vice president for technology for the Arizona Cardinals of the National Football League. The new stadium for the team, which opened in 2006 and has a retractable roof and a grass field that can be rolled outdoors, provides cellular coverage for fans at the games. Wireless connectivity is also a selling point for trade shows and other events held there.

This high-tech trend, experts say, reflects an increasingly mobile work force as well as consumers' expectations that their cellphones and other wireless devices will work everywhere.

And since the 9/11 attacks, attention has focused on the crucial role of wireless networks in public safety and emergency response. In New York City, a high-bandwidth public safety network is being deployed for emergency responders like police officers and firefighters.

The global market for so-called in-building wireless systems that use cables, antennas and amplifiers to carry wireless signals throughout a building is expected to be more than $3.6 billion by 2011, according to ABI Research, a market research company in Oyster Bay, N.Y. Much of the growth, said Dan Shey, an analyst at ABI, is coming from wireless systems that are not exclusive to one cellular or wireless service provider but allow many services to plug into a common infrastructure.

In Hearst's case, a Universal Wireless Network system from MobileAccess, based in Vienna, Va., collects cellular signals from three major carriers — AT&T, T-Mobile and Verizon, which have base stations in the building — as well as signals from the building's Wi-Fi network, usedfor laptop computers. These radio frequency signals are converted to light and run up to each floor on a common fiber optic network; they are converted back to signals through eight antennas distributed on each floor. Outgoing signals operate in reverse.

For media companies, whose products are increasingly delivered in digital form, wireless is a natural. But wireless technology is also transforming businesses in all sorts of industries, from hotels to government agencies to health care companies.

In health care, for example, equipment like X-ray machines and intravenous pumps now come with built-in wireless communications connection. A band of spectrum called Wireless Medical Telemetry Service is dedicated to wireless medical devices. That has led to new applications from digital X-ray imaging and transmission to wireless monitoring of patients.

"Wireless networks that integrate digital data are a fundamental part of the infrastructure of health care," said Timothy R. Zoph, vice president for information services and chief information officer at Northwestern Memorial Hospital in Chicago. Last month, the hospital opened the one-million-square-foot Prentice Women's Hospital, where all the nurses wear wireless devices, thus keeping their hands free, and visitors are encouraged to use their cellphones and laptops.

In-building wireless systems can make economic sense. Employee productivity can be increased by as much as 30 percent, according to the In-Building Wireless Association, a trade group that includes Sprint, LGC Wireless, Motorola and PRTM Consulting. While the systems cost from 50 cents to $1.50 a square foot, a common wireless infrastructure can save tens or hundreds of thousands of dollars in cable material and installation costs, according to companies that have installed them. Mr. Zoph of Northwestern Memorial estimated that the hospital saved $750,000 in such costs.

In addition, these systems make managing and upgrading wireless networks easier, saving on maintenance costs.

For Hearst, adding a new network service — like the more powerful Wi-Fi technology known as 802.11n, which is planned for next year — just requires plugging a component into the existing system, rather than stringing new cable, opening ceilings and adding antennas. "It's easy for us to upgrade now," said Brian Schwagerl, the vice president for real estate at Hearst, whose publications include Cosmopolitan, Esquire and Good Housekeeping. "This is where corporations are moving in the technology age."

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Such flexibility can be important when technology is evolving at such a dizzying pace. In the next few years, experts say, several commercial developments are expected to include a broad range of wireless technology and applications for consumers and businesses. WiMax, a wireless technology that allows Internet and other connections across much broader areas than Wi-Fi, will hit the market next year, they say.

New public safety networks, including the one in New York, are being prepared as well, and in January, the Federal Communications Commission plans to auction highly coveted wireless spectrum. The auction is drawing interest from players outside the traditional realm of telecommunications, like Google, which has ambitions to develop location-based applications for cellphones and mobile devices.

At the Hearst Tower, like other high-tech corporate headquarters, people can be seen conducting business around the building with laptops, cellphones and other gadgets. Mr. Schwagerl notes that William Randolph Hearst, the company's founder, always intended to add on to the original six-story building. "Is this what the old man envisioned?" he said. "I don't think so. But I think he'd be extremely gratified."