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# Super Bowl's super-stadium offers state-of-the-art wireless

**Wi-Fi, cellular and public safety nets to serve New England Patriots, New York Giants and fans**

By [John Cox](#), Network World, 01/22/08

This year's [Super Bowl](#) stadium will welcome the Patriots, Giants and their fans with an advanced wireless system. Actually, several of them.

Less than 18 months old, the [University of Phoenix Stadium](#) in Glendale, Ariz., is home to the Arizona Cardinals football team. But its 1.7 million square feet of space, [looking like a gigantic aluminum cheese Danish](#), hosts an array of other tenants and visitors, from other bowl games like the Tostitos Fiesta Bowl, to the Rolling Stones and the World of Wheels Autorama. To serve them, and up to 63,400 fans, the stadium offers pervasive Wi-Fi, wall-to-wall support for five different cellular carriers, and a separate, dedicated 450MHz public safety net.

Most of the wireless signals are being carried via a combination of single-mode fiber and coaxial cable to and from ceiling-mounted antennas, all part of a [system from MobileAccess](#) of Vienna, Va. The company is one of several vendors of so-called "in-building wireless" or "[distributed antenna](#)" systems, which typically transport multiple kinds of wireless signals to distributed antennas. The result enables pervasive high-quality cellular and Wi-Fi coverage, and lets base stations and Wi-Fi access points be centralized in one or a few locations.

Hartsfield-Jackson Atlanta International Airport, one of the busiest in the nation, adopted a similar approach, using products from [LCG Wireless](#).

### Distributing wireless

MobileAccess has [several components](#) in a central head-end, usually including base stations from cellular operators, linked via fiber to remote hubs, where the Wi-Fi access points are collected. The hubs link via coax cable to the 5-inch dome-shaped distributed antennas. Among other things, the MobileAccess gear transports the wireless signals, acts as repeaters and offers extensive network management features.

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The in-building wireless system was part of the original plan for the \$450 million, [multi-use stadium](#), which boasts both a retractable roof and playing field, says Mark Feller, vice president for technology, [Arizona Cardinals](#). The stadium does not have a traditional data center: Instead, it has the MDF, or main data facility, which houses and connects the infrastructure of all-Cisco routers and switches, and phone lines and other facilities. For the Cardinals, this central room is a way station that links Cardinal voice and data users in the stadium with the data center proper at the team's headquarters several miles away in neighboring Phoenix.

Other stadium tenants, such as the Arizona Sports and Tourism Commission, the concession service and a security company, use this flat IP net infrastructure for voice and internet access.

## **An air-blown fiber LAN**

The main network connections are created by an air-blown fiber LAN system called [FutureFlex](#), from Sumitomo Electric Lightwave, in Research Triangle Park, N.C. Instead of running fiber cable, the installers lay down tube cells, which Feller describes as a kind of freeway with multiple, empty lanes. When capacity is needed, special equipment uses compressed air or nitrogen to blow the optical medium through these lanes. "We can blow additional fiber capacity in a matter of hours, instead of days or weeks," he says.

The MobileAccess wireless system is layered over this infrastructure. "We knew we would have [demand for] every type of wireless coverage," Feller says. That includes Wi-Fi, a host of cellular services, and dedicated emergency and first-responder nets, including conventional two-way radios. "Looking at all these separately, we'd have to have repeaters and antennas all over the place," Fellers says. "It would be cumbersome, unsightly, expensive and inefficient."

After evaluating several candidates with the help of the network integrator for the stadium project, Insight, and an in-building wireless integrator, [Cellular Specialists](#) (CSI), MobileAccess got the nod. CSI handled the installation, including extensive frequency testing throughout the huge facility, finally placing 25 remote hubs to ensure optimal coverage for all the wireless signals.

The carrier base stations, from [Alltel](#), Cingular/[AT&T](#), [Sprint](#)/Nextel, [T-Mobile](#) and [Verizon](#), are located in a common facility about a mile from the stadium, linked over fiber optic cabling to the MobileAccess head-end. As each carrier was brought on line, the entire system was extensively tested to ensure optimal coverage and signal strength, says Feller.

## **Flexible Wi-Fi coverage, expansion**

The Cisco Wi-Fi access points are collected in the various remote hubs, where they're plugged into a Mobile Access aggregator. The number of access points varies with the expected Wi-Fi demand in a given area. "For us, the majority of Wi-Fi requests are in the press box during a football game," Feller says.

When more Wi-Fi capacity is needed, additional access points are simply plugged in. Temporary steel-frame and drywall booths and rooms are installed at the top of the stadium, and these and some areas outside the stadium will also get Wi-Fi connectivity. According to Feller, Wi-Fi use on the stadium floor and in fan seating is increasing, as more handsets appear with both cellular and Wi-Fi radios. ([Learn more about Wireless LAN Management products in our Wireless LAN Management Buyer's Guide.](#))

The public safety net is a separate infrastructure, with its own transmitters, repeaters and other equipment, all fully controlled by the public safety agencies that rely on them.

So far, there has been no interference from the broadcast television trucks, with their massive microwave radios, which park along the south side of the stadium during games. The only interference Feller expects will be the kind on the playing field when the undefeated [New England Patriots](#) meet the hard-charging [New York Giants](#) on Feb. 3.

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