

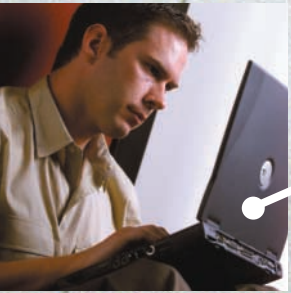
**CEILING** SYSTEMS

[ Between us, ideas become reality.™ ]



**i ceilings®**

Wireless Systems  
Integrating wireless technology  
into your building... invisibly.



**Armstrong**



## Wireless systems... here now and here to stay.

**The design of buildings to accommodate wireless technology is not a matter of if ... but when.**

Examples of how wireless communications are taking off:

- The wireless phone industry in the U.S. has grown from 86 million subscribers in 1999 to nearly 130 million today
- U.S. businesses are expected to increase their spending on wireless communications from \$37 billion in 2001 to nearly \$74 billion in 2005
- 75% of companies are expected to implement Wireless Local Area Networks (WLANs) within the next two years

Organizations that implement wireless technology in their buildings usually begin with one area, such as a single floor or conference room. As their wireless needs grow, they expand the system to other areas of the facility.

### Where wireless is used today:

- Corporate enterprises – offices, warehouses and distribution centers
- Healthcare institutions – hospitals and doctors' offices
- Education buildings – K-12 and universities
- Transportation venues – particularly airports
- Hospitality and retail – hotels, convention centers, shopping malls, cafes and more

# Why are wireless communications moving inside commercial interiors?

- In-building wireless voice and data systems provide freedom and flexibility for constant connectivity, enabling people to be more effective
- Occupants can more easily communicate and access information instantly... from anywhere in a building
- A recent study found that WLANs allow users to stay connected up to two hours longer each day, enabling the average user to be over 20% more productive!



Advanced technology through i-ceilings provides architects and owners with the opportunity to incorporate a key component of wireless systems in their buildings without compromising design.

## Conventional versus hidden antennas.

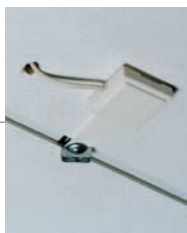
**In-building wireless systems are composed of multiple parts. One key component for effective coverage is the antenna.**

Conventional antennas for in-building systems:

- Dangle from the ceiling or are mounted on to the ceiling grid or walls
- May be subject to vandalism, theft or accidental damage
- May create occupant concerns

In addition, multiple antennas are often needed for voice and data, because these applications run at different frequencies.

Conventional, visible antennas



Wall-mounted on access point



**problem:**  
buildings that are not designed to handle wireless needs

**solution:**  
in-building wireless systems enhance

- productivity
- flexibility
- cost savings

**problem:**  
visible antennas that detract from an interior's appearance



# Clean and simple design.

i-ceilings are standard Armstrong ceiling panels with technology incorporated in them **invisibly**. i-ceilings Wireless Panels have antennas embedded inside... so the antennas can not be seen.

Armstrong partners with Centurion Wireless Technologies, Inc., a global supplier of wireless antennas, providing state-of-the-art i-ceilings panels.

## Benefits of i-ceilings:

- **Superior aesthetics** – Hidden antennas can be embedded in virtually any Armstrong ceiling tile, allowing for clean design without visual disruptions
- **“Out of sight, out of mind”** – Less subject to theft, vandalism and damage; plus occupants’ concerns about visible antennas are eliminated
- **Easy to install** – Antennas are already embedded in the ceiling tiles, saving the step of attaching visible antennas to the wall, ceiling or grid
- **Flexible** – Installed i-ceilings antenna panels are easy to relocate
- **Multi-functional** – Multiple antenna configurations are available for voice, data or both, depending on your needs
- **Excellent performance** – The ceiling plane is the best location for omni-directional antennas, so i-ceilings antennas provide efficient and effective coverage (comparable to other surface-mounted antennas)
- **Compatible with leading systems** – i-ceilings antennas are compatible with the IEEE 802.11b (or Wi-Fi) standard for WLANs. They can also be used with mobile phone service providers operating in the 850 and 1950 MHz frequency bands (such as AT&T Wireless, Nextel, Verizon, Sprint, etc.)



## Our aesthetic solution — the antenna is embedded inside

Back view of i-ceilings wireless antenna panel embedded in an ULTIMA ceiling tile.

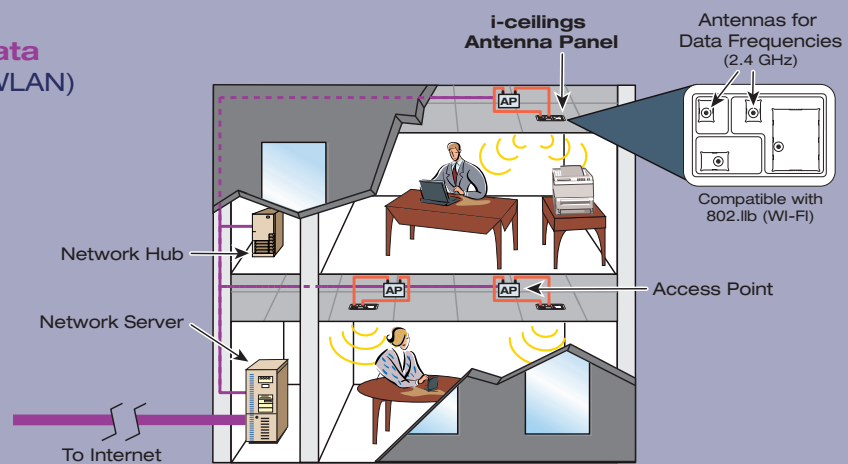
**solution:**  
**i-ceilings**  
**Wireless**  
**Systems**

# i-ceilings antenna panels are part of a complete wireless system.

## Antennas are a critical component for extending coverage in any in-building wireless system.

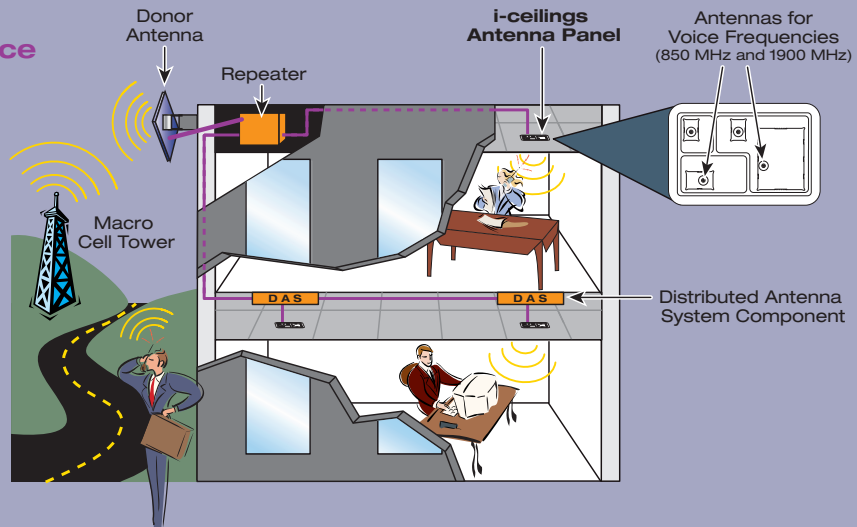
Additional components are necessary to make the system function. Below are illustrations of how typical in-building voice and data systems work with i-ceilings:

### In-building wireless data systems (WLAN)



In-building wireless data systems eliminate “the last wire” going to the work station, eliminating costly data drops to the work station, and increasing users’ mobility throughout the facility. For more information on wireless data systems and Wi-Fi compatibility, go to the Wireless LAN Association’s (WLANA) web site at [www.wlana.com](http://www.wlana.com). Armstrong is a member of WLANA.

### In-building wireless voice systems



In-building wireless voice systems eliminate wireless signal “dead spots” or shadows, allowing users to be within reach on their mobile phone anytime and anywhere within a building.

# Integrated wireless systems you can rely on.

**Armstrong wireless partners can answer questions about speed... security... your applications... how the technology is evolving... and complete system costs.**

Since antennas are one component of an overall in-building system, Armstrong collaborates with the country's leading system integrators to deliver complete wireless solutions and answers to your technical questions.

Armstrong Wireless Partners:

- Specialize in WLAN, voice, or both types of systems
- Conduct site surveys and design wireless systems for buildings — in new construction or renovation — that will not jeopardize the aesthetics of the interior
- Help select the appropriate number of i-ceilings antenna panels and other system components
- May install the complete wireless system for you

For a list of Armstrong's wireless partners, go to [www.armstrong.com/i-ceilings/wireless](http://www.armstrong.com/i-ceilings/wireless) and click on "Wireless Partners."

## Proven success.

i-ceilings Wireless Antenna panels have been installed nationwide for companies including Federal Express, Genentech, and Texas Utilities. They're also part of wireless installations in education — including the University of Oregon, Bucknell University, and Terrace Community School, located in Tampa's Museum of Science and Industry.

Read more information about our customers' success stories online — go to [www.armstrong.com/i-ceilings/wireless](http://www.armstrong.com/i-ceilings/wireless) and click on "Case Studies."

i-ceilings Wireless Systems provides the students and faculty of the Terrace Community School with wireless connectivity for their laptops anywhere in their facility.



**problem:**  
questions  
about  
wireless  
systems

**solution:**  
Armstrong  
network of  
wireless  
partners



**i** ceilings  
wireless systems

## Connecting with customers to provide solutions.

"i-ceilings is the ideal solution to keeping the indoor environment of several new buildings aesthetically attractive, while providing outstanding connectivity across campus."

— Dale Smith, Assistant Director, Network Services  
University of Oregon



"Because computers are such tremendous educational tools, we wanted our students to be able to use them anywhere in the school. The combination of laptops in conjunction with the wireless connectivity provided by the i-ceilings Antenna Panels has proven to be, by far, the best means of attaining our goal."

— Greg van Stekelenburg, Head, Technology Committee  
Terrace Community School

"i-ceilings wireless panels are ideal for performance and aesthetics, which is why we recommend i-ceilings to many of our customers."

— John Helm, Vice President of Engineering  
NetCom International

"Whether it's an airport, stadium or office building, our customers are often concerned about the wireless antennas being in plain sight. We offer i-ceilings as the perfect solution."

— Scott Goodrich, Vice President of Business Development  
Cellular Specialties, Inc.

For more information on how to incorporate the best aesthetic solution for wireless mobility in your building through i-ceilings, call **1-877-ARMSTRONG** and speak to your i-ceilings specialist.

[www.armstrong.com/i-ceilings/wireless](http://www.armstrong.com/i-ceilings/wireless)

**Armstrong**