

Wireless switches solve the remote sensor connection conundrum

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Many large facilities, campuses, warehouses and industrial organizations face a challenge. How do you efficiently install and manage a sensor and/or switch network distributed across a large area? How can you manage and control the troubleshooting and maintenance costs and time involved? How do you handle retrofits and changes to the network without extensive downtime and expense?

For many facilities, the answer is a wireless network that connects the various remote switches and sensors with a centralized control infrastructure.

Industrial wireless networks, based on the IEEE 802.15.4 wireless standard, are very robust and reliable. Snow, rain, and dust storms all have minimal impact on its transmission range and reliability.

With a range of over 1000 feet (304 meters), 802.15.4 wireless networks provide excellent results in large open buildings and outdoor installations with a relatively open line-of-sight between switch and monitor. A 35 dB link margin ensures that minor obstacles or even intense precipitation will not compromise communications. Depending on composition, the signal can even penetrate intervening walls in some installations.

To ensure reliable operation and provide for almost limitless options for installation, 802.15.4 draws so little power that the switches can be operated by industry standard batteries rather than depending on un-reliable and expensive energy scavenging. With the proper design, a wireless switch should be able to operate for several years without a battery replacement or re-charging.

802.15.4 supports a simple star configuration network configuration with each switch in the network communicating to a monitor/receiver. Communications links are point-to-point between switch and monitor; there is no signaling between switches. This network architecture keeps the switches isolated from one another so there is no opportunity for the behavior of one switch to affect the behavior of any other.

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The Honeywell Limitless wireless solution consists of a variety of wireless limit switches and receivers. The wireless switch sends a status signal to the receiver that in turn relays that signal to the network infrastructure. The receiver can connect up to 14 wireless switches at a time.

One application is the security systems for diesel and gasoline pumps at large multi-acre truck stops. With skyrocketing fuel costs, an increasingly common problem is truck operators stealing fuel by breaking open the door of the pump to get access to the controls. These pumps are often located a distance away from the truck stop operations office and can be hidden from sight by the bulk of the trucks themselves. By mounting Honeywell wireless switches on the pumps, cashiers can be notified instantly when a pump is being tampered with.

Why wireless? Running data cables is also an option, but there are many reasons why using wireless instead is the best option. Cabling requires tearing up the pavement between the pumps and the office, which is expensive and requires that the truck stop restrict operations, reducing revenues. Instead, installing a wireless network is much simpler. As these pumps already have power, the system integrator just needs to install the switches on the pumps and a receiver in the register area.

Another benefit is greatly reduced maintenance and repair. If an underground cable breaks or goes bad from the constant truck traffic, underground shifting, or corrosive leaks from fuel lines, it can cost more to tear up the driving lanes to find and repair the damage, than the original ditching and cable installation did.

A second application is the wireless monitoring of open/close status of gates and doors in large warehouses and outdoor storage/service areas. In this example, a storage yard handled train cars loaded with a variety of hazardous chemicals. A Limitless switch was installed that would automatically communicate the status of the entry gates to the facility supervisor.

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These switches can be mounted on a wide variety of remote gates to provide real time updates whether the gate is open or closed.

As they were located a good distance away, running cables from these remote switches to the office would have been prohibitively expensive. By using a wireless connection, this security retrofit was completed quickly and at a minimal cost. This remote monitor ensured that the operators knew the gate was properly opened to prevent damage from a train going through it.

Another interesting application is the use of industrial wireless at airports. Airport hangers are often located a distance away from their associated offices or security checkpoints. The challenge is to monitor the status of their doors - are they open or are they closed - especially the small pocket doors that are used for personnel access when the main door is closed. If the large hanger door rolls up while the pocket door is open, it can result in expensive damage. And with the need for increased security awareness, being able to monitor and track access to aircraft is critical.

In addition to solving the problem of installing and maintaining long cable runs underneath pavement or tarmac, these hanger doors also have the challenge issue of movement in the doors themselves. Constant moving and flexing of cables often results in breakage.

Whether for airports, for industrial facilities or for truck stop security, industry proven and cost effective, 802.15.4 wireless networks provide an ideal solution to connecting remote switches and sensors to a central monitoring location.

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Honeywell Limitless switches mounted on the small hanger access door provide security as well as limit the potential for damage when the large hanger door is opened.

In many retrofit cases, it is much faster and less expensive to simply replace a problematic cable data network with wireless instead of doing repairs. Diagnosing and replacing damaged cables requires a high level of expertise, expense and often facility downtime, all which contribute to the ROI benefits of transitioning to wireless.

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