

The Basics of Wireless Local Area Networks (WLAN) on Farms

What is Wireless Technology for Farms?

Wireless technology is a method of sending data between electronic devices using radio waves. A broad description of wireless communication would include a large variety of devices such as cell phones, remote telephones as well as radio and television; however, this article focuses on Wireless Local Area Networks (WLAN). Wireless networks allow computers and other devices to communicate with each other. The Institute of Electrical and Electronics Engineers (IEEE) sets standards for wireless technology. The most common wireless communication technology used on farms is 802.11. The IEEE Project 802.11 established a set of requirements for wireless LAN which is why this technology is called 802.11. The IEEE established various subsets of 802.11 which are identified with letters resulting in wireless technology names such as 802.11a, 802.11b, etc.

What is 802.11 Technology?

There are multiple types of the 802.11 standard of wireless communication. The 802.11 wireless operates in three unlicensed radio wave portions of the electromagnetic spectrum. The United States Federal Communications Commission (FCC) governs radio broadcasting in the United States and has set aside portions of the radio frequency band for unlicensed use. The FCC allows anyone to transmit on the 900 megahertz band, the 2.4 megahertz band and the 5 megahertz band without an FCC license. Hertz and megahertz are terms referring to the frequency of radio waves. One hertz is one radio wave cycle per second. A megahertz is one million cycles per second.

The 802.11 standard of wireless communication began in 1999 and operated on 900 megahertz frequency. This type of wireless communication was slow and there were many interference problems with the various types of equipment operated with it. Wireless network technology is developing and changing. Common types of wireless network technology used today are 802.11b and 802.11g. Both of these types transmit on 2.4 megahertz frequency and can transfer 54 megabits of data per second which means typical 100 kilobyte digital image could be transferred in a fraction of a second.

What are the Maximum Distances for Wireless Applications?

Wireless networks function within a few hundred feet indoors and several miles outdoors. The type of equipment and the building construction materials influence wireless technology operation within buildings. The maximum working distance outdoors is affected by the type and quality of the wireless equipment, terrain, weather conditions and interference from other wireless technologies. Wireless networks using common whip antennas function effectively up to two miles. Distances can be increased up to several miles using directional antennas. The effective operating distance of 802.11 wireless networks is unique to each site so it is important to try equipment to determine actual distances onsite.

Wireless Applications on Farms.

Wireless networks on farms can be used to remotely monitor and control both conditions and activities at various locations. Many sensors are commercially available including sensors to monitor temperature, relative humidity, moisture, insect activity, electrical use, motion, light, on/off activity, open/closed position. Wireless networks also provide opportunities for Internet access on farms.

How to Get Started.

The basic components of wireless networks that can be used to remotely monitor or control activities on farms include a radio base station connected to a computer and three pieces of equipment at the remote location: a remote radio modem, an electronic data logger, and the electronic sensor. A search of the Internet will provide several sites that market wireless sensor networks. Specific instructions to setup wireless networks on farms are available on the NDSU Extension Wireless Applications website at <http://www.ageng.ndsu.nodak.edu/geospatial>.

References:

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2. WLAN Technologies Series. Lawrence Harte. IP Television Magazine, November 2005 to April 2006. <http://www.iptvmagazine.com/>
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