



# Going Wireless

Grove technology is growing by leaps and bounds, with promising developments in wireless monitoring and automation.

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Currently, wireless technology is among the fastest growing technologies, and its advancement has many implications in agriculture. Wireless technology will facilitate and reduce the cost of data collection and it can be used for automation and control of different devices at the field level. High-quality and on-time information can help field managers make better management decisions. The ability to remotely access and control instruments, data loggers, and more can significantly reduce labor and transportation costs.

In general, there are two types of wireless communications: point-to-point communication and point-to-multipoint communication. In the first system, the communication is limited to only two points or devices. In a point-to-multipoint communication, one device communicates with multiple devices.

## Available Technologies

New standards for broadband communication such as Wi-Fi are very commonly used in houses and offices. The Institute of Electrical and Electronics Engineers has introduced a series of standards for wireless communication that are known as the 802.11 family. There are several ongoing research projects to expand the use of these devices to agriculture. Field Monitoring Server (FMS) is an example of such a project.


FMS is a low-cost Internet-based data collecting, networking, and storage system for ag. This technology can be used to collect large amounts of data over a wide area and provide real-time Internet-based access to the data. This system can be used for many different applications, such as measuring air quality in animal facilities, measuring weather information, monitoring tree health and growth rate in greenhouses or in the field, as well as providing video surveillance and traceability for safety and security.

Currently, this technology is commercially available only in Japan.

The University of Florida/Institute of Food and Agricultural Sciences' Citrus Research and Education Center (CREC) is a partner with NARC in further development of this technology to make it more adaptable for use in Florida's citrus groves. For example, we are using a cell-phone-based router in place of a Wi-Fi card in the FMS unit to increase the communication range of these systems and we are also working to find new applications for FMS technology in Florida.

## Zinging For ZigBee

ZigBee is another useful technology for agriculture that can complement a technology such as FMS for field applications. It is a new wireless standard that was developed recently and quickly became popular. ZigBee emitters transmit data between each other as part of a global wireless mesh network. The ZigBee protocols are designed for applications having low-data rates and low-power consumption. In a Zigbee mesh network, data can go through different paths, which eliminates the failure of the network due to failure of a single node.

ZigBee has an excellent potential for applications in agriculture. In a citrus production system, ZigBee can be used for automation or remote data collection. For example, it can be used in groves to collect multipoint soil-moisture data and eliminate the cost of running wires. Many companies have started to look at this technology for applications in agriculture. At the CREC, we have used this technology with appropriate sensors to study the dynamics of tree shaking and to evaluate the performance of the citrus canopy shaker mechanical harvesting machines. This technology will help us to enhance the performance of the existing mechanical harvesting machine. 

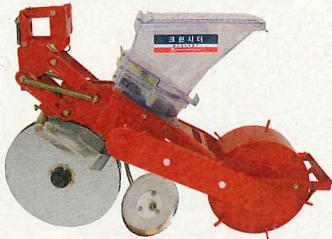
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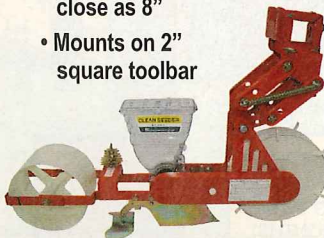
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