

3. PlantPoint™ – A WSN for irrigation and environmental monitoring/control

Decagon Devices, Inc. (Pullman, WA), our commercial partner, will commercialize the PlantPoint™ system in 2015. This system consists of three different types of nodes, which look similar, but have distinctly different functions: monitoring nodes, control nodes, and gateway nodes. Since the nodes are powered by batteries, they can be placed in production areas where power is not available and data is transmitted via wireless signal (line of sight) or cellular connection.

Monitoring nodes can be used to connect up to five sensors, but can only monitor environmental and soil conditions (not control an electric irrigation valve). Control nodes accommodate only a few sensors, but can be used to control up to four separate irrigation zones. The gateway node relays information between the control nodes, monitoring nodes, and the base station computer, increasing the geographic range of WSNs.



Figure 6. Hardware components of the PlantPoint system include nodes (gateway, monitoring and control), a base station computer (foreground) and sensors (not pictured).

The base station computer generates a website that can be accessed on-line. The computer runs the software (or graphical user interface) that is used to control the setup of the entire network and to configure irrigation parameters. Growers can use the information from the sensors to decide how they want to manage the irrigation

of different crops. These decisions can be programmed into the graphical user interface. The website can be customized with a map of a specific greenhouse, nursery, or farm and detailed information from each of the nodes can be seen in graphs that summarize the most important information from each node. The data is presented in a way that helps growers use that information to make better informed decisions about irrigation scheduling.

The website is also used to configure the irrigation control nodes. Growers can program whether they want to irrigate based on a set schedule, based on substrate water content, or based on another parameter (e.g. temperature for frost protection). The hardware and software are designed for maximum flexibility to accommodate the needs of different growing operations. One crucial feature is scalability: growers can start with a small system and gradually expand that system over time. This will hopefully encourage growers to adopt this new technology, starting with a small system to determine whether it is cost-effective and, if so, to scale up. The system is expected to be released in Fall 2015.