

Cal Tech Scientist Seeks Market To Grow Wireless Sensor System

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Staff Reporter

Kevin Delin thinks there's a market for putting plants onto the Internet.

The project manager at the California Institute of Technology's Jet Propulsion Laboratory has developed a wireless sensor system that monitors all kinds of conditions – from too much water to too little sunlight – and automatically makes the appropriate adjustments and reports the information to the Web.



Now, Delin wants to make it a business, but that's no easy task. He must first license the technology from Cal Tech, raise money in a still-weak venture capital market, continue to fine-tune the technology, and abide by regulations that limit his ability to pursue commercial interests while working on a project funded by the government.

The technology was originally developed for planetary science applications, such as searching for life on Mars. Delin won a competitive grant from the National Aeronautics and Space Administration and the Department of Defense in 1997 for his web sensors idea while he was working on solid state physics at JPL.

That led to testing the Sensor Webs Project at the Huntington Botanical Gardens in San Marino and Lancaster Farms, a wholesale nursery in Virginia.

While indoor greenhouses have used sensors for years to monitor plant life, the JPL pods were designed to withstand the rigors of an outdoor environment. They are located a few inches above a bed of plants and are connected to sensors underneath the soil. The sensors can collect data on a variety of conditions and respond with such actions as turning on sprinklers or fans. "It reacts to certain conditions that we set," said Delin.

Huntington Botanical Gardens expanded the use of the sensors from inside a greenhouse to the outside gardens and has since used it to continuously watch how certain plants react to temperatures.

One discovery was learning that a certain type of palm tree could survive colder temperatures than previously thought. Curators have also used it to rescue plants that were not getting enough water because of problems in the soil mix.

"It gives us measurable data that hasn't been collected before and I'd like to see it expanded into other areas of the garden," said Theresa Trunnelle, nursery manager at Huntington. "I would definitely buy it even if it cost hundreds of thousands of dollars."

It also has been a useful backup when the garden's main computer crashes. Since each pod acts as an independent computer, there is less risk of losing data during outages.

"I can be at home or with a laptop out somewhere and go to the sensor web page and see what's going on in the garden," said Trunnelle.

But Lancaster Farms, which installed the JPL sensors in its outdoor fields of trees, shrubs, and flowers, found that the soil sensors were not as accurate as air temperature sensors.

In the next few weeks, Cal Tech officials will reevaluate it to determine its commercial viability.

The school encourages its faculty by loaning them the money for patent applications, granting exclusive licenses to use the technology, and helping them find venture capital and legal counsel, said Fred Farina, assistant director at Cal Tech's Office of Technology Transfer.

Farina said Cal Tech would give Delin an exclusive license on the technology if he can raise a certain amount of money within a year. If he fails, the school can either grant an extension or end the commercialization effort altogether.

Building a venture business plan and meeting with investors, let alone lining up revenue-producing contracts, can be a laborious process since faculty members aren't allowed to work on their venture companies during business hours.

"They have to find a way to pursue fundraising on their own time or have a partner outside," said Ken Wolfenbarger, manager of commercial programs at the Jet Propulsion Laboratory.

But Delin says he's confident he will be able to meet the school's criteria and draw the necessary funding. Currently, he is preparing to demonstrate the technology to water municipalities, which are interested in using it to continuously monitor dissolved solids in their water supplies.

"If at that point I don't get interest from venture capitalists, something is very wrong," said Delin.

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