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Dartmouth College selects Spinwave Wireless Mesh Network for campus- wide energy management

July 21, 2010 - Green Buildings

Dartmouth College is installing a Spinwave Systems mesh network based on Spinwave sensors to monitor and manage its heating, cooling and electrical systems across the campus, the company announced today. The Spinwave system encompasses more than 200 pulse counters to transmit data every 15 minutes from meters in 125 college buildings spread out over 250 acres on the Dartmouth campus.

Spinwave, a leading sensor and mesh network company, uses a patent-pending implementation of IEEE 802.15.4, a very low-power-consumption data communication protocol. Spinwave's version adds a crucial self-adapting frequency agility that shifts the signal from channel to channel within the 2.4 GHz radio band (used by WiFi, many cordless phones and Bluetooth) to avoid the interference common to other versions.

The college expects to reduce fuel requirements by five to 15% a year and it expects to recoup its expenditures on the new system in a year at the 5% reduction rate, according to Stephen Shadford, Dartmouth's energy engineer in charge of the project. The college has operated a pilot installation since March 2009; full implementation began in January and is expected to be completed by July. The wireless network is part of the college's commitment to reduce greenhouse gas emissions dramatically over the next 20 years.

"We're very pleased that Dartmouth selected Spinwave as its partner in this challenging implementation, and that the college will recoup its investment so quickly through the energy savings," said Rainer Wischinski, vice president of marketing for Spinwave Systems.

"Now, we can analyze equipment use, factor in weather forecasts, and adjust the system appropriately, while also locating problems like faulty meters and leaking pipes," Shadford said. "We can fix, optimize and really use the system. Spinwave has the full range of products we need and they are purpose-built for this application. This is a very wide area network it's not a generic mesh network. It's elegantly simple to install. You just connect two wires and [the pulse counter] starts sending to the gateway."

The monitoring system Dartmouth is replacing is a collection of dozens of freestanding, almost entirely un-networked meters strewn across the campus. The college uses a central steam plant for heating campus buildings and the meters in each building measure the amount of steam that has condensed into water, and electricity consumption. For the most part, the college has had four people whose job is to walk around the campus, recording readings by hand once a month. The Dartmouth project is unusual among colleges, he said, because most institutions either have gone to the expense and upset of installing a wired network to monitor energy use, or have simply made do with a manual recording system like Dartmouth's. The project was helped in part by a grant from the state of New Hampshire Greenhouse Gas Emissions Reduction Fund.

Because the data have been collected and entered on a monthly basis, it has been impossible for engineers to develop a load profile (a snapshot of current usage) or to adjust the system operation in response to current requirements. For the college it was, "like getting your bill from the fuel company once a month " said Shadford. In addition, if a meter failed, it might be weeks before the failure was even discovered, losing valuable data in the meantime.

"We've gone from one data point a month [per meter] to 3,000 a month," said Shadford.

Many 802.15.4-based products are designed to operate in the 2.4 GHz RF band, which is used by many other wireless devices, such as WiFi, cordless telephones, microwaves and Bluetooth communications. This can cause serious interference problems for other systems using 802.15.4. Spinwave's patentpending implementation of the protocol, gives the Spinwave system a reliability that other implementations of 802.15.4 cannot deliver.

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