Fighting Fires With RFID and Wireless Sensors

A new product aims to provide more details about fire, speeding up efforts to control them.

By Beth Bacheldor

Nov. 7, 2006—Telepathx, a wireless and communications company based in Melbourne, Australia, has introduced a new RFID-based sensor designed to alert firefighters within minutes of a fire's ignition.

The company's VRF sensor includes an active RFID chip that operates at 433 MHz and uses both a proprietary air-interface protocol and wireless thermal sensors. When the sensors discern temperatures within 2 degrees of a predetermined setting, they activate the RFID tag, communicating its unique ID number to an interrogator called the Pinpoint Remote Transmission Unit (RTU). The system cross-checks the tag's ID number against tag numbers stored in the RTU's memory, then assembles a default message and sends it out to a contact person's cell phone via the Telepathx Mobile Network. The goal is to dispatch firefighters to the scene of a fire faster and more quickly.

The sensors can communicate with an RTU within a range of about 300 feet. Nine sensors and four RTUs are enough to monitor a linear kilometer, according to James Eades, Telepathx's CEO and founder. For fire-mapping and monitoring along roadways, the RTUs are installed 1 to 1.5 meters below the utility pole's cross arm. The fire-mapping sensors are secured to the utility pole or fence post, about a half-meter above the ground. Each sensor costs about A$34.95 (US$27), and each RTU is A$199 (US$154). That adds up to approximately A$1,200 (US$930) to monitor a kilometer.

The TPX-VRF sensor is a byproduct of another fire-sensing system, Firesighter, which Telepathx unveiled in late 2004. Firesighter was designed for energy companies looking to protect their utility poles from burning in the bushfires common in Australia, Eades says. "The concept was to mitigate damage and reduce restoration time in post-fire events," he says.

The market response was mixed, Eades admits, explaining that energy companies really wanted early-warning systems able to alert them not just to fires, but also to equipment failures on the utility poles. "As it turns out, the apparatus on the utility poles, such as the insulators, transformers, fuses and cables, fail with some regularity. And they are also a significant bushfire ignition source that eventually burns thousands of hectares per year—and that's just in the state of Victoria," Eades says.

Telepathx spent nearly 21 months developing the new product with the assistance of five separate laboratories (three in Australia, two in the United States) to get the sensors robust and economically viable. "To be honest, I can't remember a single week that I did not work less than 70 hours," recalls Eades.

Still, he predicts, the end result will be worth it. Though declining to divulge client details, he says Telepathx has been getting calls about the TPX-VRF sensor from companies all over the world, including the United States, Canada, Portugal, Spain, France, Greece, South Africa, Brazil, Argentina, Mexico and China.

Meanwhile, another group has developed its own fire-detecting system. Researchers at the University of

California, Berkeley, have developed the FireBug, a GPS-enabled wireless sensor that gathers real-time data about approaching wildfires, as well as firefighter location and health data (such as carbon monoxide levels), then transmit that data via an RF transceiver containing a Chipcon mote. The researchers wrapped up the project last year, including a series of tests in controlled fires. UC Berkeley has filed for a patent for this system (see Fighting Fire With FireBugs).

The Berkeley researches say they hope to see the FireBug become a commercial product. "We'd like to see it commercialized, and are seeing investors or a company that's interested in that," says Nicholas Sitar, a professor at the university's department of civil and environmental engineering, and one of the FireBug researchers.

Sitar notes that the FireBug might have been beneficial to combating the deadly wildfire set by an arsonist on Oct. 26 in Cabazon, Calif. Stoked by winds, the fire swept southwest through the San Jacinto Mountains, killing five firefighters and destroying numerous homes and more than 60 square miles of land.

"While it wasn't a problem that firefighters couldn't see where the flames were, they just didn't have a good sense of the speed and intensity of the fire," says Sitar, nor could they see well through all the smoke. A network of FireBug sensors, he states, could have provided details that may have changed the way they approached fighting the blaze.