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DETECTING A DIFFERENT KIND OF LEAK

Firm touts fiber-optic line to plug porous US border

UA SUPERVISES TEST OF TUCSON COMPANY'S REMOTE-SENSOR DEVICE

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A Tucson engineering company thinks technology developed to monitor for leaks in oil and gas pipelines could help the Department of Homeland Security plug its leaky borders.

Brad and Caroline Cowan of Cowan Horse Adventures helped test Zonge Engineering and Research Organization's buried fiber-optic line.
Enlarge Photo

Zonge Engineering and Research Organization says a buried fiber-optic line may be a cheaper alternative to border fences and a complement to the expensive high-tech towers considered for our southern border.

A recent test of the technology, overseen by University of Arizona researchers, found that a buried fiber-optic line allows a remote sensor to instantly report traffic across it, with a precision that can differentiate between a human or animal coyote and tell the difference between a horse rider and a motorized vehicle.

Deployment of 64 sections of the system, in 50-kilometer lines connected to one or two sensors, would cover the entire southern border, says a UA report. First, though, the system must be proven to work at longer distances than the 100-meter test, slightly bigger than a football field.

The system, called the Helios Distributed Acoustic Sensor, is a fiber-optic line buried 18 inches in the dirt, connected to one- or two sensors that read disturbances in a laser pulse sent through it. Having sensors at either end would allow the system to continue working even if the cable were severed.

The test of the system was done in November by Moe Momayez, associate professor in the University of Arizona's department of mining and geological engineering, and Kevin Moffitt, a research scientist with the UA's Center for Border Security and Immigration. Their report says the system works in Arizona's soils and holds promise but needs additional testing.

The system has "theoretical advantages" over what's being used now, said Moffitt, most notably its range. "I observed a 100-meter sample," he said, "but they say it works up to 50 kilometers (31 miles). It's not like a ground sensor, localized in one small area."

It could have uses outside the immediate border area as well, said Gary Jones, a security consultant working with Zonge on the project. "You could run it around checkpoints where people are concerned that people are avoiding them by going through their neighborhoods."

The technology is low-cost, invisible and easy to maintain, said Jones.

One advantage, said Momayez, is that it is proven technology, developed by the British firm FOtech Solutions and already used to monitor pipeline flow and leaks.

Scott Urquhart, Zonge president and senior geophysicist, said his firm is now trying to interest agencies involved in border security in a larger-scale test of the system.

"We've pushed it to the point where a small company in Tucson, Arizona, is going to need some other partners," said Urquhart.

The report proposes a larger, 2-to-5-kilometer test of the technology over a period long enough to build a "library" of sonic footprints.

Momayez said the real proof won't come until a full 50-kilometer section is installed.

One big concern has been met, said Momayez. He wasn't sure that the system, which works well in damp, compacted soils, would give readable signals in the loose, alluvial soil of the Southwest's dry washes. "We tested and got very good responses," Momayez said.

Momayez said he thinks the system might be attractive to federal agencies stung by glitches in experimental technology they attempted to deploy in the SBInet program.

"This is a lot simpler technology. I think we have a better handle on it and we have the tools," he said.

Right now, the technology requires human interpretation of the sonic disruptions displayed in graphs, Momayez said, but over time the system can build a library of signals that a computer can recognize.

Development of that capability is critical to weeding out the "false positive" signals caused by cattle or wildlife.

"A successfully deployed system would discriminate between animals and humans, groups and individuals, and illicit and legal traffic. With reliable algorithms, agents intercepting the source of triggers would have more assurance they were tracking humans," according to the report.

Urquhart said his firm is still crunching numbers on the cost of the system, but he is certain it can be deployed for 10 to 20 percent of the $2 million-per-mile cost of the border fence and for a fraction of the $1 billion allocated over five years to the experimental SBInet system of towers.

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