HOUSTON CHRONICLE
ENERGY

Wireless system could shake up seismic industry

Sugar Land company says its devices simplify the process of collecting data about what exactly is underground and speed it up as well

J. Patric Schneider/Freelance

Mick Lambert, CEO of Wireless Seismic, says the company's wireless seismic sensors, on display at its Sugar Land headquarters, can free oil and gas explorers from the heavy and costly cable that typically links the devices they use to evaluate underground formations. (J. Patric Schneider / For the Chronicle)

By Ryan Holeywell
October 20, 2014 | Updated: October 20, 2014 11:18pm

SUGAR LAND - In a grassy lot behind a Sugar Land office park, Mick Lambert walks among a field of dozens of small white boxes spread out neatly in rows for examination by prospective clients.

The devices - part of a system dubbed RT System 2 - are used to collect seismic data. But unlike the seismic devices that

for years have provided oil and gas explorers with a picture of what lies underground, these are wireless. Lambert said they could revolutionize the way companies look beneath the Earth's surface.

Lambert demonstrated the system on a mild fall day in Houston, but he said the technology can withstand just about anything.

"We've tried them in the mountains, the desert and the jungle; from Kurdistan to Siberia," said Lambert, president and CEO of Wireless Seismic, the Sugar Land-based maker of the device. "We've established that this works across the board."

Petroleum geologists use seismic imaging to help understand the locations and sizes of underground oil and gas formations. The process involves shooting sound waves underground - often generating the sound with explosives or vibrating metal plates - and then measuring how those sound waves move as they echo back to the surface. Done enough times, it can a provide a map of the path to hydrocarbons.

Historically, seismic work involves laying an array of sensors on the ground, connected by cables. But that setup becomes more cumbersome as the web grows.

"As you got bigger and bigger, the weight of the cables and crossing the roads became a challenge," Lambert said. In some cases, a major project could require 600 miles of cable weighing tons.

The next generation of seismic operated without cables, but came with a limitation. Devices called autonomous nodes stored data internally and didn't display the big picture until the individual devices were collected and analyzed.

But Wireless Seismic's leaders say they've developed a method that allows seismic sensors to transmit information back to a trailer for analysis in real time, vastly simplifying the process of data collection and speeding it up as well.

"This is the best of both worlds," Lambert said.

The technology can reduce the time it takes to collect seismic data from days or weeks to just seconds, Lambert said. And that's generated investment from some of the bigger players in the energy industry.

Among interests that collectively have pumped millions of dollars into the business are Oklahoma City-based Chesapeake Energy; the venture capital arm of France's Total - one of the world's largest oil companies; and Energy Ventures, a Norwegian private equity firm.

Wireless Seismic, incorporated in 2006, has about 60 employees in the Houston area. While the industry has long worked to develop wireless seismic, only recently have innovations in battery and radio technology made it possible on a large scale.

"Several companies have tried to build it, but they tried too early on, and the technology wasn't there," Lambert said.

Arranged in lines

Wireless Seismic launched its first large-scale deployment of the devices in 2012, and since then it's worked on about 100 commercial projects. In a typical use, the boxes - known as wireless remote units - are hooked up to geophones that measure sound waves and are inserted a few feet underground.

The units are arranged in lines about 80 feet apart. As they collect the data, they pass it along to the next box in the row through a process called a "bucket brigade." Since individual units don't send data long distances, their batteries often last more than 20 days.

Eventually, that information connects to a larger transmitter that beams it to a trailer as far as three miles away, where computer software can assemble a picture of the sub-surface. That software also tells seismologists which devices might have been damaged by animals or the elements, when a battery needs a charge, or whether interference from other sound sources have disturbed the data collection process, requiring a re-do.

Today, the company's largest field of Wireless Seismic units is in the Kurdistan region of Iraq, where 13,000 of the devices are on the ground collecting data for Oil Search, an exploration and production company.

The technology has filled a void, said Peter Duncan, founder and co-chairman of MicroSeismic, a Houston business that uses the devices to monitor hydraulic fracturing jobs for exploration and production companies.

"Having a wireless system has been a dream of the exploration business forever," Duncan said.

Older wireless systems could record data, but operators wouldn't know if they were working properly until they manually retrieved the devices.

"You could send a radio signal out that turned the boxes on. ... but you didn't know if they actually turned on, or if they were still there," Duncan said.

Duncan said his company can arrange an array of seismic sensors in two-thirds the time it takes to set up a wired system.

Although a French company, Sercel, makes a competing wireless system called Unite, Lambert said his business' biggest competition right now is still the older cabled systems. Eventually, that will change as other wireless technology moves in to compete.

Costs more at first

Though his company's technology costs more than wired or autonomous node systems, he said customers make up for it with lower personnel and logistics costs. Each wireless unit costs about $1,200.

Today, the company has 10 patents on its technology and another 16 pending.

Lambert said his goal is to make the technology scalable and more cost-effective. He wants it to be feasible to deploy 30,000 units at once.

He also wants the devices to become increasingly automated, with the ability to adjust if obstructions block the typical pathway the signal takes as it hops between units.

"We've put a lot of effort into minimizing manual intervention," he said.