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Technology helps Arizona utility locating company find underground obstacles

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HIGH-TECH HIDE AND SEEK

PEGASUS UTILITY LOCATING SERVICES USES STATE-OF-THE-ART TECHNOLOGY TO FIND WHAT ITS CLIENTS ARE SEEKING

STORY: **DAN HEIM** PHOTOS: **MARK HENLE**

People have long searched for things underground: Water, food, metals, minerals, gems and fuel were early targets. Divining rods, aka dowsing rods, were the first "technology" employed in the search. These devices date back to around 6000 BCE, according to archaeologists. Dowsing still has its advocates, but most scientists challenge its efficacy.

Fast forward to the early 1900s, when the invention of metal detectors added a real tool to the arsenal. Radar, invented in WWII, was the next. It opened a window that worked as well for underground locating as it did on aircraft. In this century, ground penetrating radar (GPR) has reached an amazing level of sophistication. And acoustic systems have opened yet another window.

Colission Wells, founder, owner and CEO of Pegasus Utility Locating Services, knows a lot about underground locating technology. He's an expert in this field with more than 33 years of hands-on experience.

"The technology is constantly evolving," says Wells. "To stay ahead of the competition, we do upgrades as needed, ensuring we're current with the best technology out there. It's a significant capital investment, but it pays off."

THE EARLY DAYS

Wells got his start in the locating business in 1980 doing seismic surveying in Louisiana. In 1984 he moved to Arizona and joined Mountain Bell where he did underground phone line locating. He founded Pegasus in 1994, headquartered out of his home. Pegasus is now in an industrial park in central Phoenix. Wells says he chose the Pegasus name and logo because "the symbol suggests speed, power and mobility."

"I sensed the locating industry was kind of fragmented back then with some companies providing some services, but none that could do it all," Wells says. "So that was my goal with Pegasus. I wanted to be the one-stop shop for locating services in Arizona."

Initially a sole proprietorship and since then incorporated, his company has grown to nine employees, including wife Melanie, business affairs and CFO. Pegasus now wields an impressive arsenal of the latest locating technology. Past clients include municipalities, developers, utilities, airports, hospitals, commercial properties, public sites and private property owners throughout the state of Arizona.

"I SENSED THE **LOCATING INDUSTRY WAS KIND OF FRAGMENTED BACK THEN** WITH SOME COMPANIES PROVIDING SOME SERVICES, BUT NONE THAT COULD DO IT ALL. SO THAT WAS MY GOAL WITH PEGASUS."
Colission Wells

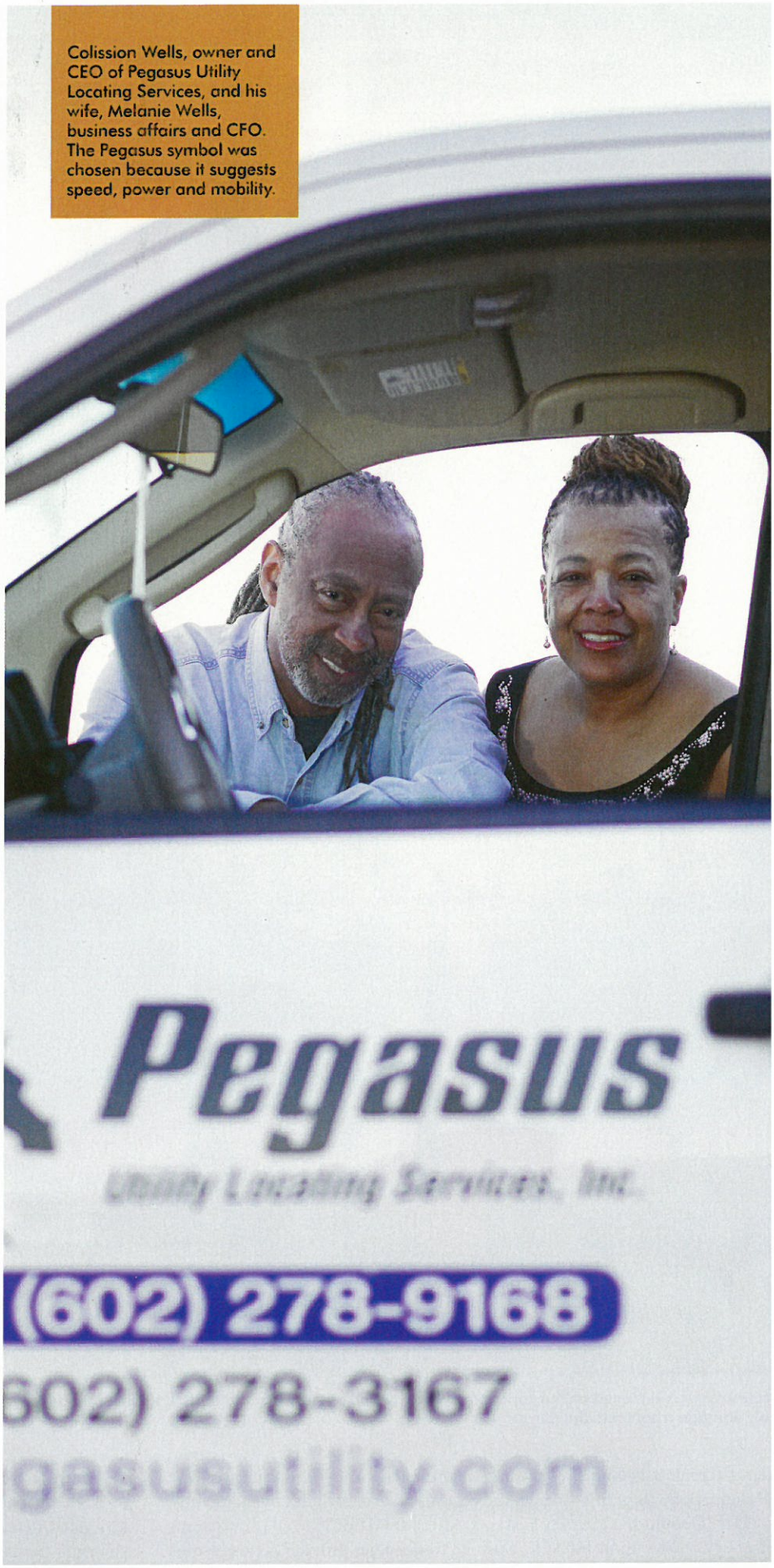
When asked why the Blue Stake program was insufficient and why companies like his were even needed, Wells responds, "Easy question. Blue Stake helps, but it's not always current, and it doesn't locate private utilities. Many contractors and property owners make changes to what's underground and never report it to Blue Stake. So if you really need to be sure, give us a call."

And Pegasus is still growing. "We do have plans to expand beyond the state of Arizona," Wells says, smiling. "But I can't talk specifics there — would hate to have the competition beat us to the punch, you know?"

EQUIPMENT ARSENAL

"Having the latest and best technology available is important," says Wells. "It gives us the ability to find just about anything at typical scanning depths. It helps us live up to our performance claims and legitimizes the Pegasus mission statement."

To that end, Wells has amassed an impressive arsenal of locating technology, all portable, and all capable of single-user operation. The GPR units can interface with com-

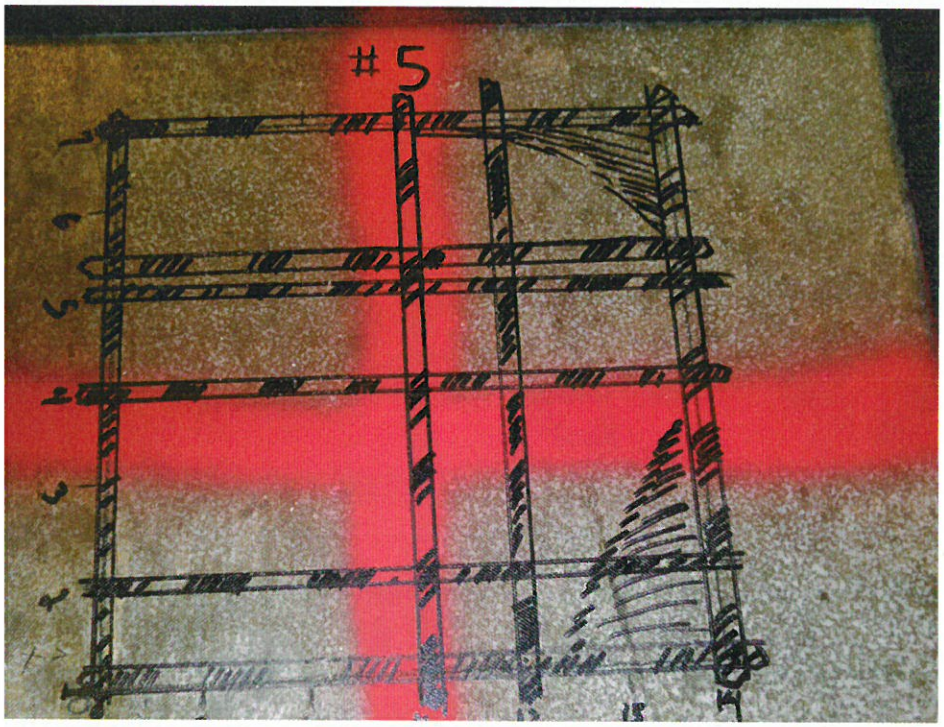


Colission Wells, owner and CEO of Pegasus Utility Locating Services, and his wife, Melanie Wells, business affairs and CFO. The Pegasus symbol was chosen because it suggests speed, power and mobility.

Pegasus Utility Locating Services, Inc.

LOCATION: Phoenix, Arizona
OWNER/CEO: Colission Wells
FOUNDED: 1994
EMPLOYEES: 9 full-time
SERVICE AREA: Arizona statewide
SERVICES: Base locating, fault locating, metal detection, leak detection, sewer camera, ground penetrating radar, smoke testing, potholing
WEBSITE: www.pegasusutility.com

The staff of Pegasus, front row, from left: Ledell Harris, Melanie Wells, Colission Wells and Mike Eakins. Back row, Kevin Barton, Jeff Mortenson, Archie Brown, Kenneth Kardell, Billy Brown and Jeff Williams.



ated rebar is sketched on the concrete surface, providing guides for later drilling. Steel rebar will lly damage a concrete drill bit.

ers to create 3-D models of subsurface infrastructure. Most units are GPS/ compatible. As of this writing, the Pegasus arsenal includes the following:

GSSI (Geophysical Survey Systems) SIR 3000 GPR: The radar frequency ıser-selectable, up to 100 kHz. Specific frequencies provide better results, depending on the soil type and what you're looking for.

GSSI StructureScan Mini HR: The HR stands for high resolution. It also uses GPR, but with a fixed 2,600 MHz radar system. Higher frequencies provide higher resolution both vertically and horizontally. This unit can precisely locate multiple layers of rebar, post-tensioning cables and conduit at depths down to 16 inches. It can also measure the slab thickness.

Goldak Triad 2310 ULS pipe and cable locater: The Triad can target specific utilities by frequency selection, ranging from 50 Hz (acoustic mode) to 200 kHz. Settings are stored internally and cataloged for specific targets. It does not interface with a CAD program. Rather, its operation is much like a traditional metal detector. When the operator is over the correct spot, the Triad provides an acoustic signal via speaker or headset.

3M Dynatel 2573 pipe and cable locater: The Dynatel also has a selectable range of operating frequencies, from 577 Hz to 200 kHz, for finding specific targets. It can work in trace or induction mode. Dynatel's latest model, already on the Pegasus wish list, will include an upgrade allowing computer interface.

Metrotech HL 400 Leak Detector: This is an amazingly sensitive acoustic device, capable of hearing the sound of leaks from a lateral distance of 150 feet. After detection, a lateral sweep to the point of maximum decibels puts you right over the leak.

Jeff Mortenson, field supervisor, uses the Goldak Triad pipe and cable locator near the service entrance on a client's building.

Wells demonstrated the Metrotech in the conference room at Pegasus. Conversations in adjoining rooms were clearly audible. And that required a reduction in gain to avoid hearing damage. The headset is a tightly fitting isolation design.

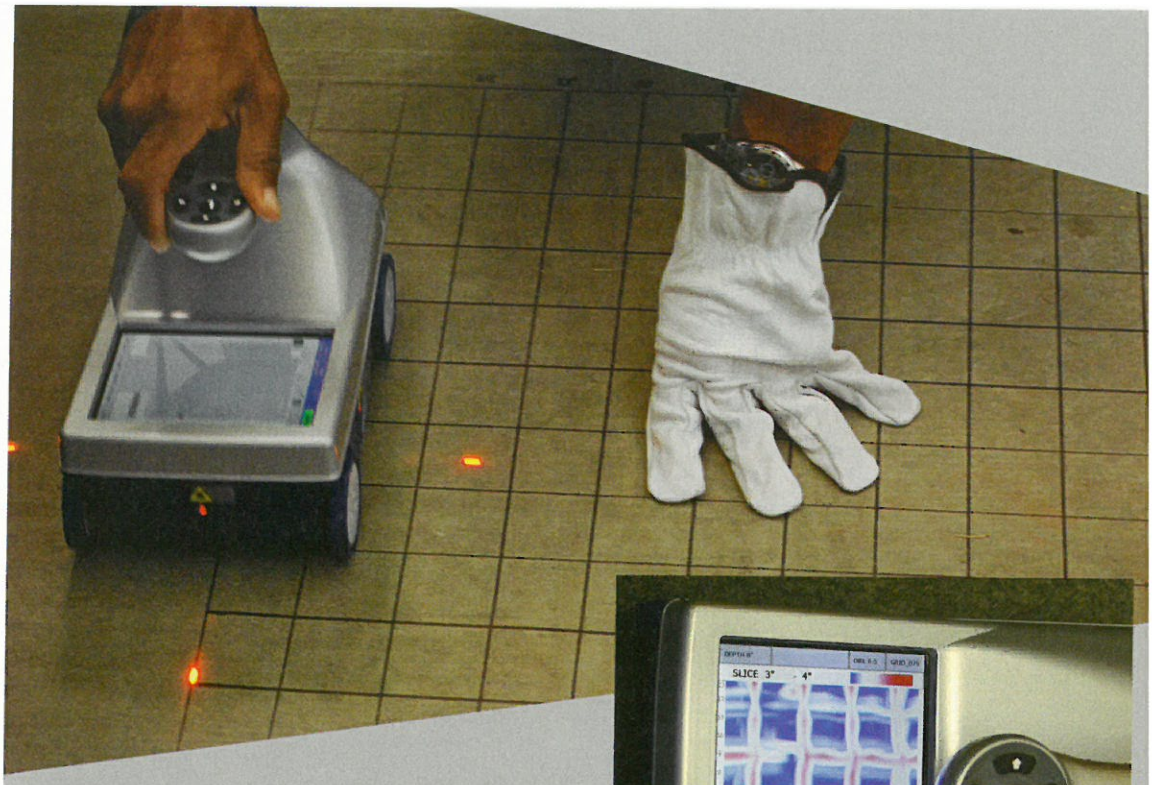
FINDING THE TARGET

Arizona soils contain large amounts of metals, as well as caliche — a calcium carbonate aggregate that, when wet, is highly conductive. Both components interfere with the high-frequency RF used in GPR, making locating in this state more difficult than others.

Few manufacturers provide specs for the maximum depth at which their units can locate infrastructure. There are just too many variables. One variable is target size: Larger targets can always be detected at greater depths, whatever equipment you use. So there are no industry standards for reporting "depth of operation."

Despite these caveats, Pegasus almost always finds their target. Their success is grounded in years of experience augmented by technological expertise. They can accurately locate cables, conduit and pipes delivering cable TV, electric, natural gas, irrigation, sewer and water, fiber optics, and phone service. And they could probably find that special ring you dropped somewhere on your lawn, even if it's been stepped into the soil.

But every once in a while, the standard technology comes up a bust. You can dig blind and accept the risk, or you can go to Plan B. Wells says, "Sure, I carry a copper dowsing rod in my truck. When my technology fails me, which isn't very often, I try dowsing. And I can tell you, on many occasions it has worked."



TOP PHOTO: The GSSI StructureScan Mini HR (High-Res) being guided by laser along a pre-drawn grid on the floor. INSET: The screen displays rebar beneath the carpeted concrete slab floor in Pegasus headquarters.

Small but powerful

Colission Wells, owner and CEO of Pegasus Utility Locating Services in Phoenix, likes to keep his locating equipment up to date. When asked if there is one particular piece of equipment he is especially proud of, he disappeared briefly into the storage room, returning with what looked like a small RF controlled 4WD toy — except for the digital display on its "roof."

"This is the GSSI [Geophysical Survey Systems] StructureScan Mini HR," Wells proudly states. "The HR stands for high resolution. It's our latest acquisition. Cost close to $18,000, but let me show you what this thing can do."

Wells set it down on the carpeted floor of the conference room at Pegasus HQ, turned it on and rolled it manually over a distance about 2 feet. The digital display was near instantaneous. An image of the rebar in the slab under the carpet was clearly visible.

"When you're drilling through concrete you really don't want to hit steel rebar," Wells says. "That stuff will trash a drill bit." The image can be transferred manually, drawn on the floor like a grid, and the excavators will know exactly where they should drill.

The StructureScan Mini also provides depth data and can interface with a computer if the client wants a 3-D model of what's under the surface. It can also print a graph that is then mapped to the floor, drawn by hand for later reference by excavators or drillers.

THE PEGASUS FLEET

Pegasus Utility keeps one Ditch Witch FX60 in their fleet. The FX60 i capable of either dry or wet vacuum excavation. It has a spoil tank capacity c 800 gallons and can pump and excavate at a rate of 950 cfm.

Wells notes, "Depending on the job, sometimes you need to get that exca vated fill back in the hole the same day. Dry vac lets you do that. In other case you really need a wet vac. It's good to have both options."

Wet vacuuming offers several advantages over dry vacuuming. Specifi cally, water:

- Is more efficient when working in tough soils.
- Helps control the buildup of static electricity.
- Avoids the "sandblasting" effect of high-speed air.
- Acts as its own lubricant, speeding the removal of fill.

gasus technicians Billy Brown (left) and Jeff Williams on a vacuum excavation job with their Ditch Witch FX60, which is capable of either dry or wet excavation.

- Can be heated for excavation through frozen topsoil.

Pegasus can also deploy their Guzzler NX (on an International chassis) for y-vac jobs. With a capacity of 16 yards (about 3,200 gallons) and an excava- n rate of 6,000 cfm, it's used when more capacity or excavation speed is quired. Those needs sometimes trump the hydrovac's greater versatility, but e two units are nicely complementary.

Their fleet of Nissan Frontier pickups is used for transporting equipment d crews to job sites. They're capable of off-road use, too, and provide com- table climate-controlled cabs — a nice perk in Arizona where, in an aver- e year, 100 days see temperatures in excess of 100 degrees F. After a long, t day on the job with all targets successfully located, the crew's ride home a welcome and well-deserved respite.

OMMITMENT TO THE INDUSTRY

"It's all about damage prevention," says Wells. "We'll find whatever's down ere and report on it in detail, providing 3-D CAD drawings if needed. Fail- e on our part to locate accurately presents a hazard to the people on the job d potential damage to expensive infrastructure.

"Unfortunately, once we turn the info over to the excavators, it's often out our hands. Sometimes damage still happens. Diggers are tempted to go for e more bucket with the backhoe before getting in there with shovels. Nobody es to dig the old way. So they go for that last scoop, and that's how the dam- e almost always happens."

The Pegasus mission statement, proudly displayed on the wall of their main fice, sums up their attitude toward safety and customer service:

We are committed to making the construction industry safer by providing a gh-quality and accurate Subsurface Utility Engineering (SUE) product to map and ate underground utilities, thereby helping construction companies prevent damages.

We strive to make contractors' and utility owners' environments safe for excavation and rehab, by performing our high-quality and accurate service with prompt response, at an affordable price.

To that end, all hires receive extensive training. New technicians undergo four weeks of classroom and field training, and must pass both written and field tests to obtain their locating certification. Every new technician is closely monitored by field supervisors for an additional month.

Further, all technicians undergo retraining and testing each year. Some is done in-house. Other more specialized training, such as for work in mines and confined spaces, is done via offsite certification programs. The Pegasus training program meets or exceeds the standards established by the National Underground Locating Contractors Association.

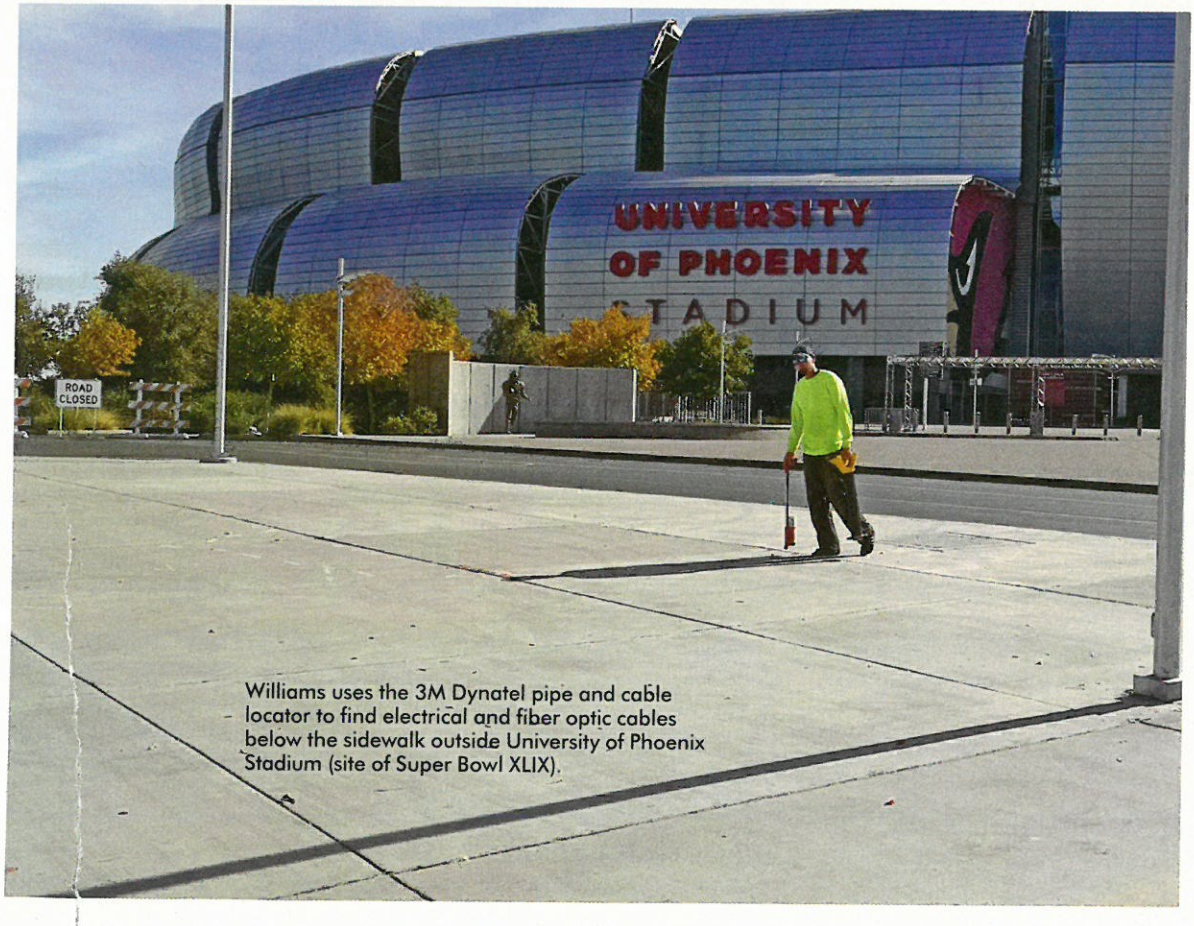
STAYING AHEAD OF COMPETITION

Pegasus is looking to expand to the international market, establishing branch offices as needed in the near future. The underground locating busi- ness is effectively driven by the construction industry, with its usual ups and downs. But Wells claims things have been steadily improving, long term, since the crash of 2006-2007.

Always looking for better ways to do the job and never content with what the vendors have to offer, Wells is developing a new "tool" for smoke testing, now in its third prototype, and eventually to be patented. Details at this time are, of course, proprietary.

Wells, smiling again, says, "Can't tell you much more about that either, sorry. But this could revolutionize the process of smoke testing. Once I've got my patent, come back for another interview. Like I said earlier — it's all about staying ahead of the competition." ▼

"HAVING THE LATEST AND BEST TECHNOLOG ... GIVES US THE ABILIT TO **FIND JUST ABOU ANYTHING AT TYPICAL SCANNING DEPTHS.** IT HELPS US LIVE UP TO OUR PERFORMANCE CLAIM AND LEGITIMIZES THE PEGASUS MISSION STATEMENT."
Colission Wells



Williams uses the 3M Dynatel pipe and cable locator to find electrical and fiber optic cables below the sidewalk outside University of Phoenix Stadium (site of Super Bowl XLIX).

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