

CANINES AND SATELLITE TEAM UP TO FIND LEAKING WATER IN CENTRAL ARKANSAS

By Gadi Kovarsky – Utilis

Rescue dogs are in the spotlight these days, with Major, a German Shepherd rescue dog, being the first dog from an animal shelter to reside in the White House. Another rescue dog farther south in Arkansas, Vessel, was rescued and placed in a Paws in Prison program to be trained as a Service Dog. She was a little too high energy for the traditional service dog role.

At the same time, the CEO of Central Arkansas Water (CAW) attended a water seminar in Oxford and learned about a UK water utility using dogs to sniff out leaks from the potable water system. A CAW employee put him in touch with a trainer who volunteered in the Paws in Prison program and Vessel was selected to train as America's first water leak detection canine.

Those trainers have since created a training school for more water leak detection dogs called *On the Nose* Water Leak Detection Dogs, outside of Little Rock. Now Vessel is a full-time member of the CAW leak detection team.

CAW uses Utilis, a satellite imaging company, to pre-locate leaks in the water distribution system. Utilis was founded in 2013 and has been providing its satellite-based leak detection product to utilities since 2016.

With no equipment or CAPEX spending necessary, the Utilis solution is attractive to small or large utilities alike. With the potable leak detection product first commercialized in 2016, over 400 projects have been completed worldwide in countries including the United States, Italy, UK, Chile, China, and South Africa, leading to almost 30,000 leaks verified and saving customers eight billion gallons a year.

Over 85% of the leaks identified pursuant to a Utilis satellite directed program are found on the utility side of the meter, resulting in a significant reduction of non-revenue water and great value to the customer. About 60% of leaks found are non-surfacing or background leaks that would not have been identified except for the satellite subsurface imagery of the Utilis solution. During an average day spent in the field searching for leaks being guided by the Utilis algorithm, a crew will identify 10.5 million gallons per year (MGY) of lost water that can be recovered and saved.

Utilis utilizes specialized RADAR signals from satellites to illuminate the area of interest and collects the resulting reflected signals. These signals are analyzed and processed to identify specific indicators of wet soil saturated with potable water. The result is a map showing



likely leak locations (LLL), or Points of Interest (POI). These results typically encompass 5% of the entire system length. Only locations where there is expected to be a leak are inspected. This is where Vessel comes in.

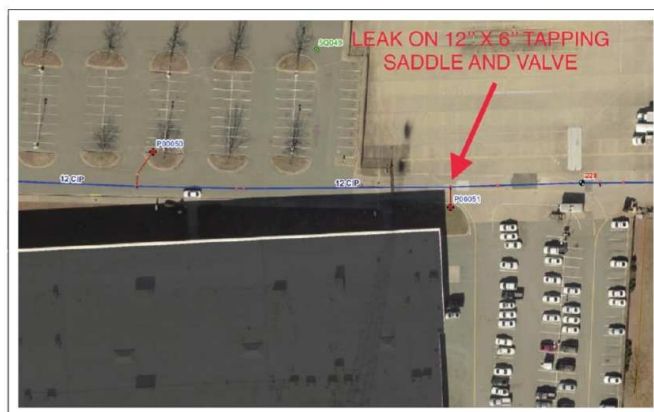
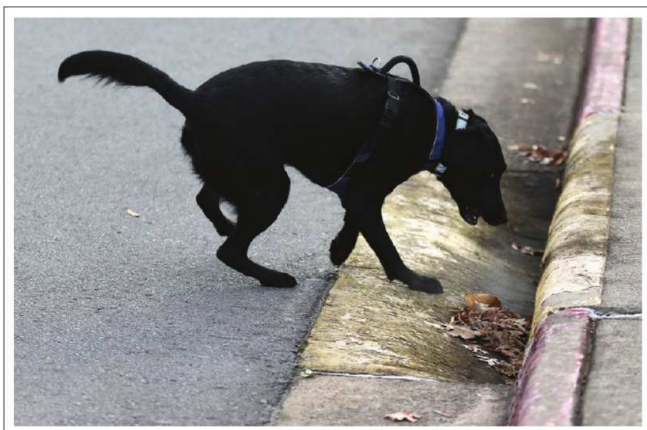
CAW started inspecting LLLs identified by Utilis in December 2017. CAW has an average of 10.9% non-revenue water from their 2,750 miles of water mains. The results are consistent with other Utilis projects and much better than traditional boots-on-the-ground (TBOTG) methods as shown in the Table.

Utilis-directed performance at CAW is a nine times improvement over TBOTG for the number of leaks found per mile inspected and three times better for the leaks per day metric.

Leak Detection Performance at Central Arkansas Water		
	Leaks per Mile	Leaks per Day
Utilis North American Average	2.8	3.6
TBOTG North American Average	0.3	1.2
CAW Utilis Results	2.8	3.3

Dogs possess a sense of smell many times more sensitive than even the most advanced man-made instrument. CAW's leak detection team, Vessel, and her handler Tim Preator are sent out to areas identified by Utilis to search for leaks.

Vessel knows it is time to work when she 'gets dressed' and puts on her harness. She is put to work using the command 'Find Leak'



– making a broad sweep of the LLL and then pinpoints the leak, usually within 10 to 15 feet. She shows a passive alert, laying down and barking, when a leak is found. She is rewarded for her efforts with tennis ball play.

She has become familiar with typical leak locations, such as fire hydrants, and knows to inspect these specific areas. She does not pay attention to standing water and can differentiate between leaking drinking water and swimming pools – even though she was trained to detect chlorine. Vessel can cover three to five LLLs per day, depending on the weather.

Vessel is over 90% accurate in detecting leaks. She has been working in the field since October 2019. CAW staff uses conventional acoustic correlation pinpointing tools to specifically locate the leak so that crews can dig and repair the pipe. This reduces the number of leaks found per day in the field due to confirming Vessel's indication with human validation.

As more confidence is gained in the efficacy of Vessel's pinpointing ability and the ability of the handler to accurately read her body language, the number of leaks pinpointed per day will rise and overall efficiency will improve. In one case, Vessel found a non-surfacing leak that was between a six-inch valve and the tapping saddle off of a 12-inch cast iron main under a concrete parking lot. The lot is built over a gravel base that allowed the water to flow directly into a storm drain.

This leak alone was costing CAW 2.3 million gallons per month. This demonstrates the value of the Utilis program, showing the ability to identify leaks that are not visible and would not have surfaced.

Leak detection has evolved from old-school divining rods and listening sticks to space-age satellites, and now back to the basics – using the innate capabilities found in nature.

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1620 W. Fountainhead Parkway
Suite 501
Tempe, AZ 85282
Phone 480.893.8860
Fax 480.893.8968