

Researchers improve corrosion-detecting technology to prevent leaks in pipes

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Southwest Research Institute (SwRI) has created the next generation of transducers that use ultrasonic guided wave technology to detect anomalies in pipes, enabling users to prevent leaks before they start. Credit: Southwest Research Institute

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anomalies in pipes, enabling users to prevent leaks before they start. The device, which utilizes the SwRI-developed Magnetostrictive Sensor (MsS) technology, will be showcased at the [American Society for Nondestructive Testing's \(ASNT\) Annual Conference](#) in Nashville, Tennessee, from October 31 to November 3.

"Pipeline corrosion resulting in leaks is very common," said SwRI Staff Engineer Sergey Vinogradov, who developed the technology with Staff Engineer Keith Bartels and other SwRI staff members. "There are only a few current methods to detect defects before they cause leaks. Quite often, the pipe is repaired and re-inspected after a [leak](#) occurs. We've developed a technology that can consistently monitor the pipe's condition, hopefully preventing leaks from happening in the first place."

The technology is known as a Magnetostrictive Transducer (MsT) Collar. It was originally developed by SwRI in 2002. The updated version has a flat, thin design allowing it to be used on [pipes](#) in tight spaces. In custom configurations, it can withstand heat up to 400 degrees Fahrenheit. The new, segmented MsT design also features eight sensors that give the transducer the ability to more accurately identify where in the pipe corrosion is occurring.

The MsT Collar utilizes magnetostrictive sensors, which generate and receive guided waves that propagate along an elongated structure, guided by its boundaries. This technique allows the waves to travel long distances with little loss in energy. In some cases, hundreds of meters can be inspected from a single location, though obstacles such as couplings would require an additional sensor.

"Instead of using one sensor to cover an entire pipe circumference, allowing only the axial location of an anomaly to be measured, we now have eight sensors in the transducer," Vinogradov said. "Each of the [sensors](#) are independently connected to the electronics so that all possible

guided wave signals can be acquired. Algorithms combine this information to better detect and locate the anomaly both axially and circumferentially, and the growth of the corrosion can be monitored by examining [data sets](#) acquired over time."

The MsS system can send data to a remote terminal via a wireless transmitter unit or by means of a wired connection. It is designed primarily for oil and gas transmission pipelines to prevent costly and damaging leaks before they begin. However, the technology is versatile and has been used for other industrial pipes such as those used for water, heating, or in chemical plants.

Provided by Southwest Research Institute

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