



## KEEPING THE TAPS ON: ON-STREAM INTEGRITY INSPECTION OF UTILITY PIPELINES

While Advanced Non-Destructive Testing, or ANDT, is regularly utilized in the energy sector, the techniques which fall under the ANDT category are also quite advantageous in other sectors. It is common that these other sectors will encounter a variety of critical components and infrastructure requiring condition assessments. Regardless of the sector or industry, whenever fluids or vapors need to be stored or transported, the components and infrastructure will require a varied amount of integrity evaluation. Not limited to the external surface, the techniques are often utilized for internal inspection of external blind spots or obstructions such as the saddle support areas.

The utilities industry can often manage potential loss of containment by providing remedial repairs for areas with known leaks. This reactive strategy is not always beneficial and there is a concern that leaking pipework can cause further problems in the future. Although the product is not typically regarded as dangerous to the environment, loss of containment can still be costly and must be managed. Introducing a more proactive integrity strategy can help identify defects at an earlier stage and therefore allow for periodic assessment of identified defective areas, stopping a leak at the source will always save time and money in a long-term strategy.

To consistently meet this goal, industry should seek a trusted equipment solutions provider dedicated to supplying clients and stakeholders with a turnkey solution that supports application deliveries.

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### THE CHALLENGE

Find a non-destructive and cost-effective solution which will remove the necessity to shut down for manned entry or mechanical lifting of pipework from supports.

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### THE SOLUTION

Universal technology offered in a turnkey package to provide non-intrusive inspection of assets in lieu of manned entry.

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### THE BENEFITS

Fast, recordable, and quantitative data sets for integrity assessment of components without the requirement for destructive testing or manned entry, increasing on-stream utilization and cost saving benefits.

## The Challenge

Technicians performing visual surveys of pipeline integrity have to contend with a number of challenges including full removal of internal product, cleanliness of internal surface, confined space entry, internal and external blind spots. In some cases, there is no viable visual inspection and therefore a component may be run to failure, periodically replaced based on historical data or mechanical disassembly to allow the opportunity to assess the extent of any corrosion. Mechanical disassembly can be costly and time consuming when considering all necessary steps to facilitate; when apart, only then can a decision be made whether the component requires maintenance, repair, or replacement. Key advantages in utilizing advanced NDT methods would allow the pipeline to remain on-stream, provide instant information for planned maintenance, repair, or replacement and also recordable data sets for future assessment, or even case studies to predict maintenance programs for replica pipeline environments.

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An expansion joint would be a typical internal blind spot and therefore phased array corrosion mapping is a perfect tool for assessment. The following images show expansion joint in-situ (Image 1) and one recently removed from service (Image 2). Phased array corrosion mapping was performed on the ex-service sample and the severity of corrosion can be seen in the B-C-D-Scan displays (Image 3). The inspection data highlights the huge advantage for future inspection of these expansion joints in-situ.

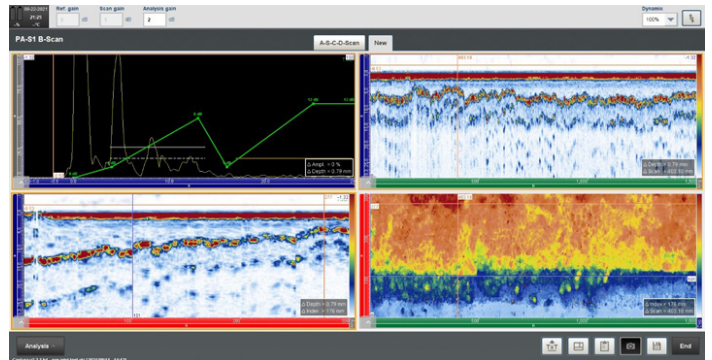
From an external blind spot perspective, for example a pipe support, while there are ANDT options to verify corrosion under pipe supports like M-Skip, PA-CAT and Short-Range UT, sometimes the technology will not suit wall thicknesses, severity of corrosion, or access. Opportunistic inspection when the pipeline is offline could be performed from the internal surface in these areas to fully map the severity of any corrosion present underneath these supports. The alternative from a visual aspect would require mechanically lifting the pipeline off the supporting structure. Sometimes this is not an option and can cause more damage to the asset. Paired with the multiple operations required for this, ANDT is the perfect alternative.



**Image 1:** In-situ expansion joint to the left of the R-Scan Array buggy; portable Mantis PAUT instrument also shown



**Image 2:** Ex-Service expansion joint with notable severe corrosion



**Image 3:** Data snapshot of expansion joint - Note - B and D scans, bottom left and top right, displaying severe wall loss

## The Solution

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Originally released in 2019, the R-Scan Array was developed to provide phased array corrosion mapping with the popular RMS automated scanner by Eddyfi Technologies. With integrated electronics for data acquisition and stitching, an ergonomic handle, and interchangeable low and high friction wheels, the commercially available solution is the first choice for one-person operations. Following positive feedback from equipment users worldwide, the R-Scan Array easily provides a cost-effective corrosion mapping solution in its own right following some design improvements. The optimized version based on recommendations from extensive field use enhances user performance for both automated inspection with the RMS scanner as well as in a manual capacity when connected directly to leading phased array ultrasonic testing instruments produced by Eddyfi Technologies' centers of excellence.

At Eddyfi Technologies there are a number of solutions which cover a wide range of applications and inspection environments, both of which need to be considered for what equipment and technology is chosen. Of course, differences between portable, manually operated solutions versus automated deployment exist and for this scenario with its remote location, it was imperative the solution be easy to use, portable for quick data acquisition, analysis, and reporting, while still able to have recordable data sets for future assessment. R-Scan Array was chosen over the LYNCS™ in this instance due to the sole requirement of corrosion mapping and smaller areas required for assessment. From the images it is clear how remote the inspection requirements are which highlights the necessity for fully portable solutions that do not compromise on data quality or recordability.

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## The Benefits

Benefits of the R-Scan Array include:

- Ergonomic handle for ease of data collection
- Interchangeable wheels to improve magnetic force when in manual mode
- Enhanced probe locking mechanism
- Integrated breaking system to help with setup, calibration, and operations
- On-board controls for pause/resume, data stitch, and encoder reset.

When utilized independent of the RMS, the R-Scan Array compliments the Mantis™ PAUT instrument for a fully portable and cost-effective, entry-level system for users across all sectors who have the necessity to offer condition assessment of their infrastructure.

All of these ergonomic and cost efficiency improvements are a great compliment to Capture™ acquisition and analysis software embedded on the Gekko® and Mantis portable phased array ultrasonic testing instruments. Operators have assisted defect analysis tools to instantly locate areas of wall loss, automate remaining thickness measurements, and provide a 3D map of the areas scanned. One of the features on the Capture platform is floating gates, a game changer for internal and external surface conditions where signal amplitude can vary due to the amount of reflected energy received by the probe.

Eddyfi Technologies presents a unique, symbiotic product offering that leverages advanced technologies from its many centers of excellence to provide the inspection solutions trusted to deliver all the data necessary for proactive asset health management programs. Contact us to discuss optimizing your operations today.