

UltraWave LRT

Guided Wave System for In-Service Pipe Inspection



- Long-range screening for pipe integrity assessment
- Buried, coated, and insulated pipe inspection capability
- F-scan color map with multiple frequency display
- Active and synthetic focusing
- Low clearance probe collar

Pipe Inspection with Guided Waves

Offering the capacity to screen in-service pipes and pipeline over long distances, guided wave inspection is used to localize areas of concern on above-ground conventional structures and for advanced applications such as buried, insulated, coated, and vertical pipes. This technology also detects corrosion at supports, clamps, and pipe racks.



Buried and road crossing pipes



Corrosion under insulation (CUI)



Pipe racks



Vertical pipes

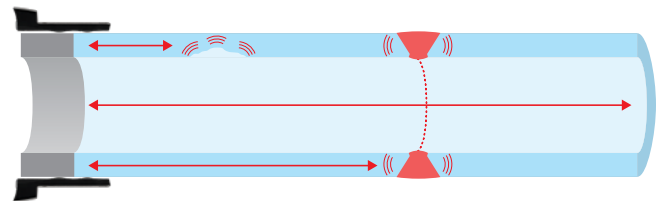
Guided wave technology can perform inspections on pipes with limited access. It pinpoints locations that require further inspection, avoiding unnecessary excavation, coating removal, or scaffolding, if no flaw is detected. The use of this technology helps provide a significant reduction in operating costs and is considered an inspection solution for unpiggable pipes.

Guided Wave Technology

Guided wave technology is a nondestructive testing method used to locate potential degradation, such as internal or external corrosion and metal loss. While conventional UT provides localized inspection, underneath or in the vicinity of the sensor location, guided waves are able to screen the entire pipe wall, over tens of meters, from a single inspection position. Then, prove-up inspection only needs to be conducted at the specific indication position. Combined with other NDT techniques, a guided wave system will help to maximize the efficiency of a corrosion management program, without compromising data quality.



Conventional UT provides localized inspection, underneath or in the vicinity of the probe location.



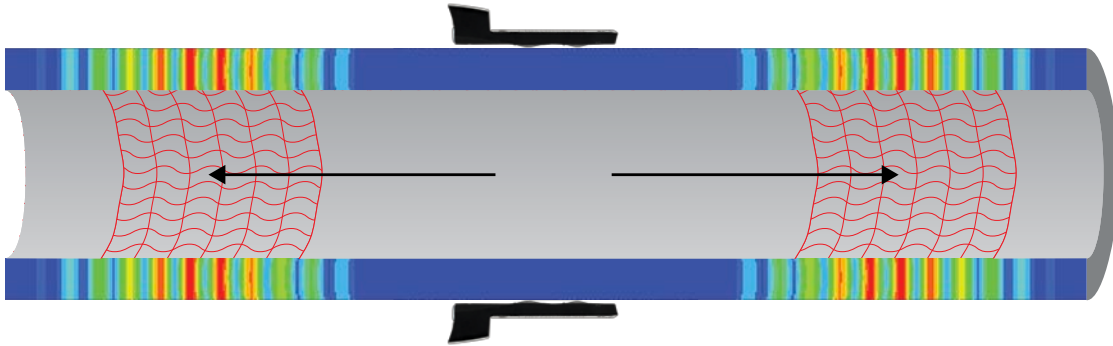
Guided wave inspection allows for the entire pipe wall to be screened over tens of meters from each side of the probe collar location.

Advantages of Guided Waves

- High productivity inspection with long-range coverage and rapid screening.
- Ability to scan pipes with limited access, such as buried, coated, insulated and through wall pipes, leading to cost reduction for excavation and insulation removal.
- 100% screening coverage of pipe wall.
- Cost effective solution for pipe integrity management programs.
- In-service inspection (no production shutdown).

UltraWave LRT System

The UltraWave LRT system excites low-frequency ultrasonic waves that propagate in the axial direction of the pipe, from both sides of the probe collar. Various factors influence the maximum inspection distance: the pipe configuration and environment, the type of fluid inside the structure, and the type of coating. The propagated torsional waves detect general variations in the total cross-sectional area of pipe, as well as changes in the material properties.



Inspection lengths range up to 91 meters (300 feet) on each side of the probe collar.

The Olympus UltraWave LRT system is a turnkey solution with all the tools and accessories required to perform efficient inspections in the field :

- Data acquisition unit with a broad frequency range, from 15 kHz to 85 kHz, and an inspection length that extends up to 182 m (600 feet) bidirectionally.
- Standard probe collar kits, covering pipe diameters from 2 in. to 24 in. OD.
- Probe collars for other diameters available upon request.
- Rugged industrial touch-screen laptop computer.
- Latest version of UltraWave LRT software with advanced features such as F-scan, Active Focusing and Synthetic Focusing (C-scan).
- Tool kit, spare parts, and user manuals.



Code Compliant

Guided wave technology is now widely accepted as an inspection technique and is covered by ASTM international standards. The UltraWave LRT system is designed according to the industry standards and will contribute to a code-compliant inspection procedure.

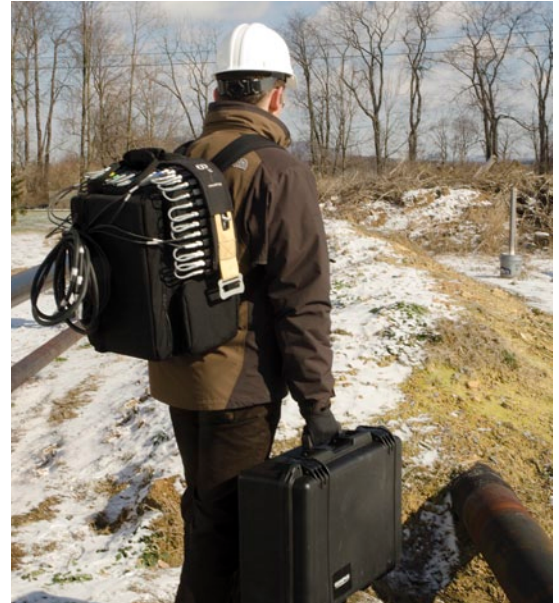
Hardware

Acquisition Unit

The UltraWave LRT system includes a 16-pulser acquisition unit with a frequency spectrum of 15 to 85 kHz, adjustable in 1 kHz steps for high resolution. Lower resolutions are available in the software to reduce acquisition time and data file size. Portable and battery operated, the unit is supplied with a backpack for easy on-site transportation. The system offers optimized power management with two hot-swappable batteries to maximize on-site efficiency.



UltraWave LRT Acquisition Unit.



A single operator can carry the system and perform the inspection.

Probe Collar

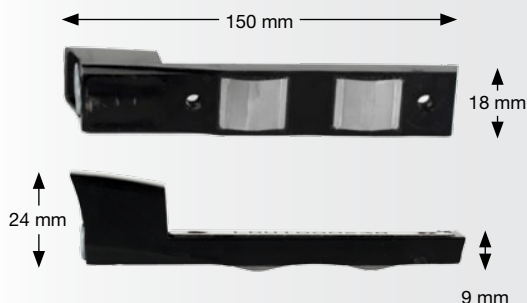
The probe modules are sealed in a molded housing for increased durability in rough environments. Their lightweight and low-profile design ensures consistent contact and stability on the pipe surface during data acquisition.

- Compact and low-profile probe module.
- Completely sealed probe module for high reliability.
- Highly resistant stainless steel wear plates.

The Olympus UltraWave LRT system has several design features that make setup straightforward and secure. All the necessary information for probe module installation is clearly displayed on the collar.

- Probe collars available for pipes as small as 2 in. OD.
- Total collar height of about 30 mm offering extremely low clearance.
- Highly flexible and portable bands for limited-access locations.
- Color-coded cables and bands for easy wiring.
- Resilient collar with easy sliding buckle, fiber-reinforced bladder, and integrated Kevlar retention strap.

Probe Module Dimensions

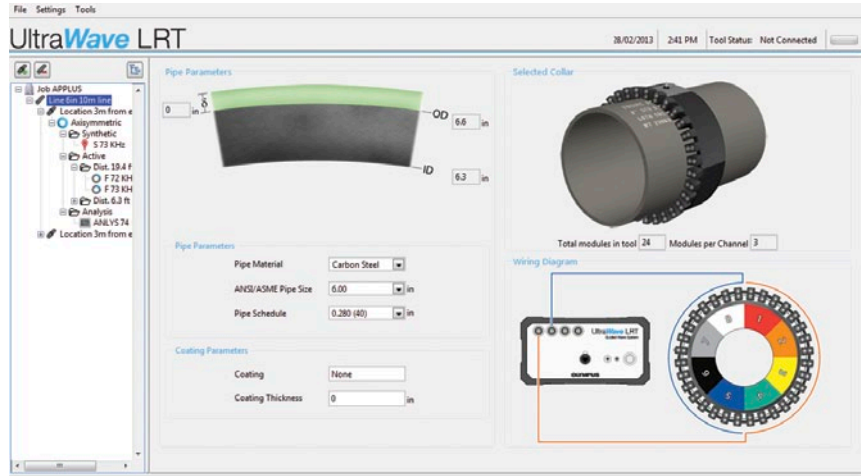


UltraWave LRT Software

Setup

Defining the scope of work for an inspection job is a critical part of the planning process for a guided wave examination. The UltraWave LRT user-friendly software provides a step-by-step wizard for entering the inspection parameters.

- Clear identification of each inspected line and its location, as well as the pipe size, material, configuration, and more.
- Illustrations, detailing the positioning and orientation of the probe collar.
- Intuitive tree control for database management.

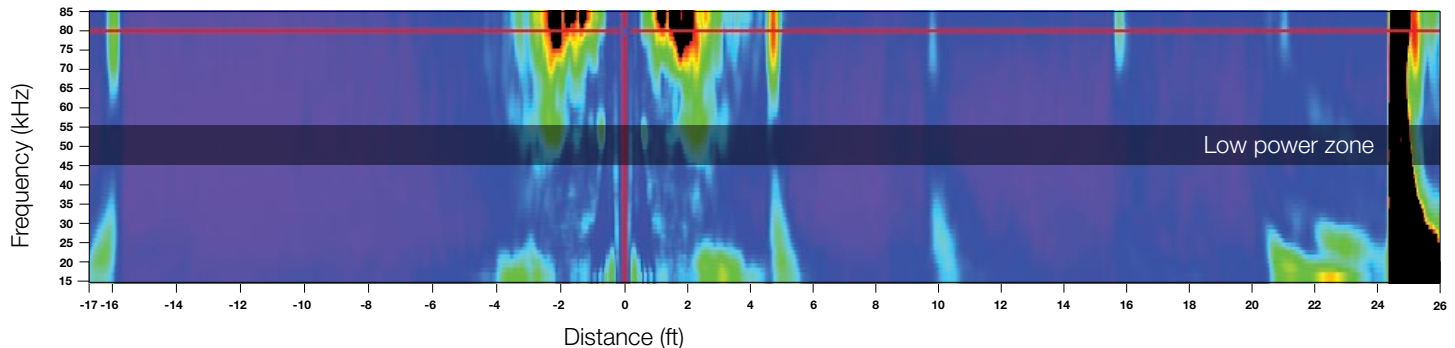


The user-friendly software facilitates the management of all relevant inspection information.

Analysis

F-Scan Color Map

Guided wave technology is a frequency-dependent detection method. The UltraWave LRT software is equipped with a unique F-scan color map that displays the entire frequency range acquired over the inspected pipe length. With this color map, selecting the optimum frequency for further analysis is fast and intuitive. A shadowed zone on the F-scan represents the low area of the power curve.

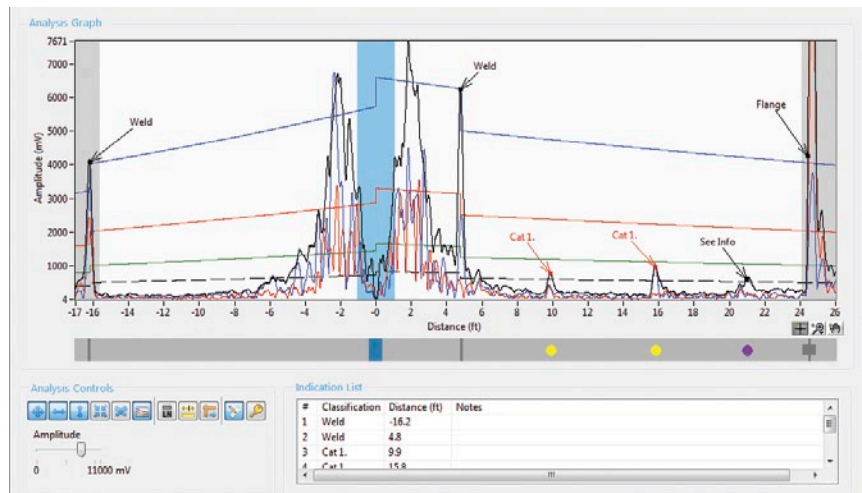


The F-scan color map displays the entire frequency range at a glance.

A-Scan Analysis

Once a frequency is selected, the corresponding A-scan is displayed and used for detailed analysis. The A-scan analysis features distance-amplitude correction (DAC) curves, reflector annotations, and an option for additional notes. Two independent sets of DAC curves can be adjusted for the forward and the reverse direction.

When an indication is tagged on the analysis graph, the software updates the pipe schematic with a pre-selected symbol. Then this information, including the user's notes, is compiled in an indication table, which is saved for the report.

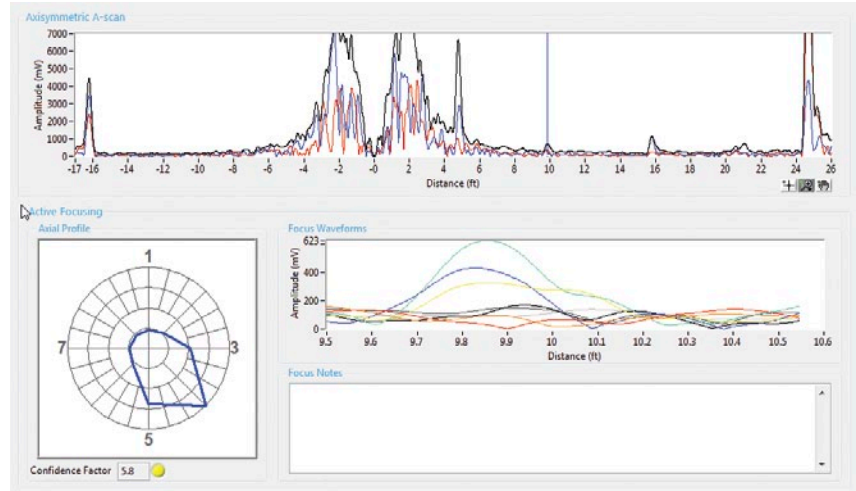


An annotation list linked to a defect table allows for a quick A-Scan analysis.

Active Focusing

The active focusing capability enhances the flaw evaluation performance by delivering concentrated energy to a specific portion of the pipe, resulting in a better signal-to-noise ratio. Once a specific distance on the pipe has been selected, the energy is then focused at eight different positions around the circumference, investigating the pipe cross-section, segment by segment. The active focusing also estimates the circumferential extent of the indication.

- Polar plot representation displays the scope of the indication from a circumferential viewpoint.
- Improved penetration power and inspection confidence for advanced applications such as buried or heavily coated pipes.
- Reduced defect false-alarm rates.

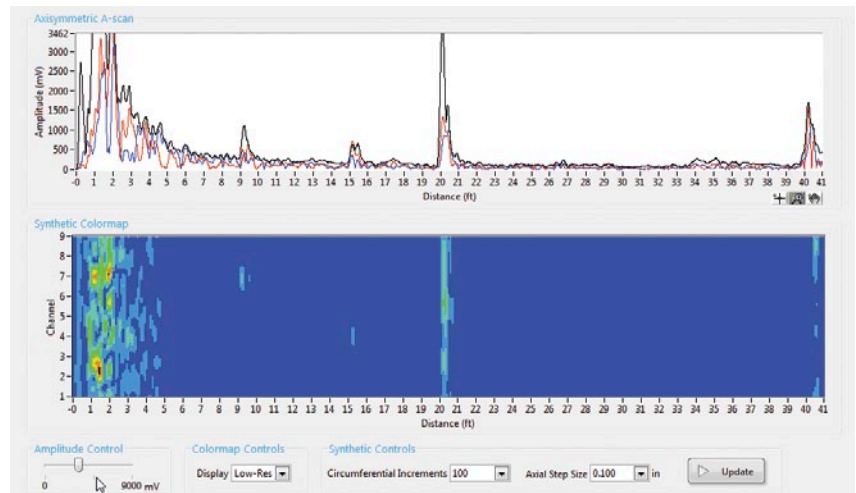


The active focusing mode delivers concentrated energy at the desired distance, and the corresponding axial profile evaluates the indication extent.

Synthetic Focusing

Synthetic focusing is a post-processing tool (offline) for advanced data analysis. A virtual image of the unrolled pipe (C-scan) is generated, based on the phase velocity of the received mode. It is performed at one selected frequency.

- Displays the entire inspected zone.
- Provides the axial position and circumferential extent of all defects.
- Unrolled pipe view (C-scan).

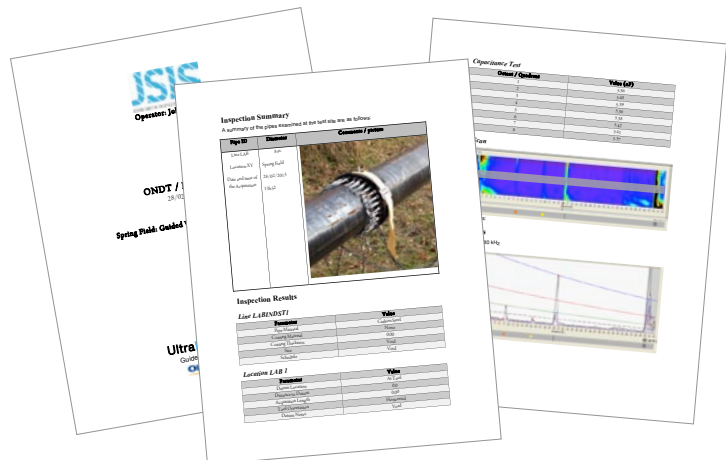


Synthetic focusing mode provides an unrolled pipe view (C-scan).

Reporting

A report automatically compiles all of the necessary inspection data into a single document. Specific data can be selected and added to the user-friendly Report Tree menu, including F-scan, Active Focusing and Synthetic Focusing views. The report is customizable with all the details related to the inspection location.

An integrated camera on the laptop allows the user to quickly import a picture of the inspected site into the report.



Localized Corrosion Measurement

Once an area of concern has been identified using the UltraWave LRT, it is recommended to perform prove-up testing on the indication using other NDT methods. Olympus NDT offers a variety of products for corrosion inspection with high accuracy and resolution, such as portable thickness gages and phased array solutions.



45MG and 38DL PLUS

The 45MG and 38DL PLUS are advanced ultrasonic thickness gages packed with standard measurement features and software options. These unique instruments are compatible with the complete range of Olympus dual-element and single-element thickness gage transducers, making these innovative instruments all-in-one solutions for virtually every thickness gage application.

- Dual element corrosion gaging.
- Precision thickness measurements.
- Grid mapping.



OmniScan MX2 with 16:128 Phased Array module

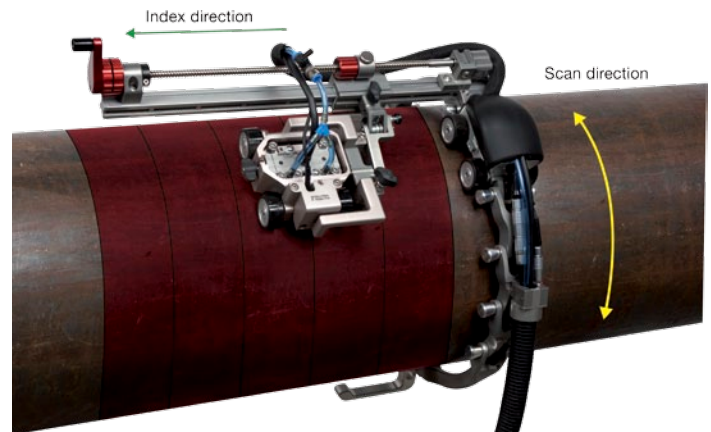


RexoFORM with phased array probe and encoder

OmniScan MX2 with RexoFORM or HydroFORM

To ensure a complete coverage of the surface and increase inspection speed, the HydroFORM, and RexoFORM, solutions provided with the OmniScan MX2 are designed to offer a very precise Phased Array inspection for the detection of wall-thickness reductions due to corrosion, abrasion, and erosion.

- 100% coverage.
- Manual or semi-automated scanning.
- Fully encoded scan and data storage.



HydroFORM and CHAIN Scanner

UltraWave LRT Specifications*

ACQUISITION UNIT SPECIFICATIONS

Weight	7.1 kg (16 lb)
Dimensions (W × H × D)	250 mm × 150 mm × 400 mm (9.8 in. × 6 in. × 15.7 in.)
Environment Specifications	Storage temperature: -20 °C to 60 °C (-4 °F to 140 °F) Working temperature: 0 °C to 45 °C (32 °F to 113 °F)
Power	Two lithium-ion batteries and AC adaptor
Instrument Autonomy	1 day of typical 8-hour shift operation
Standards	CE, RoHS, WEEE
Casing	IP54 rated

BATTERIES

Battery Model	OMNI-A-BATT2 (U8760059)
Battery Type	Smart lithium-ion batteries

PULSER SPECIFICATIONS

Number of Channels	16
Pulse Type	Square wave
Pulse Voltage	40–300 Vp-p
Mode	Pulse-Echo
Frequency Range	15 kHz to 85 kHz
Number of Cycles	1–10

UltraWave LRT Ordering Information

Part Number	Item Number	Description
UW-SYSTEM-2-12in	U8801501	UltraWave LRT Guided Wave system Includes 6 bands, 6 bladders, 50 probe modules, and cables to cover pipes ranging from 2 in. to 12 in. pipe OD. Ruggedized laptop with latest version of UltraWave LRT software (2 dongles), tools and accessories are also included.
UW-SYSTEM-2-24in	U8801502	UltraWave LRT Guided Wave system Includes 12 bands, 12 bladders, 90 probe modules, and cables to cover pipes ranging from 2 in. to 24 in. pipe OD. Ruggedized laptop with latest version of UltraWave LRT software (2 dongles), tools and accessories are also included.

Please contact an Olympus NDT representative to order bands and bladders for other pipe diameters.

Olympus NDT Training Academy

The unique Olympus NDT Training Academy offers comprehensive courses for advanced technologies and applications. Introduction courses and in-depth courses are available with our training partners and, in all cases, students experience practical training using the UltraWave LRT unit.

Please contact an Olympus NDT representative or visit our web site for more information.

www.olympus-ims.com/training-academy

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OLYMPUS

For enquiries - contact
www.olympus-ims.com/contact-us

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