Products & Services

Technology you can trust.

GUIDED ULTRASONICS LTD.

GUIDED ULTRASONICS LTD.

Since its incorporation in 1999, Guided Ultrasonics Limited (GUL) has pioneered the Guided Wave Testing (GWT) method for pipeline inspection and monitoring.

GUL is a high technology company with a unique culture based on world-class customer service, excellence, teamwork, and commitment to meritocracy. The quality of our people is the cornerstone of our continuing success. We stand out because we are responsive to and understand our client needs.

GUL develops and delivers innovative, visionary and essential technologies for a substantial and diversified client base around the world that includes oil and gas companies, refineries, chemical processing, transport infrastructure, and power generation enterprises. We do not provide an inspection service. Our inspection equipment and monitoring services provide inspectors and asset owners information that enables them to safely increase the efficiency of their facilities.

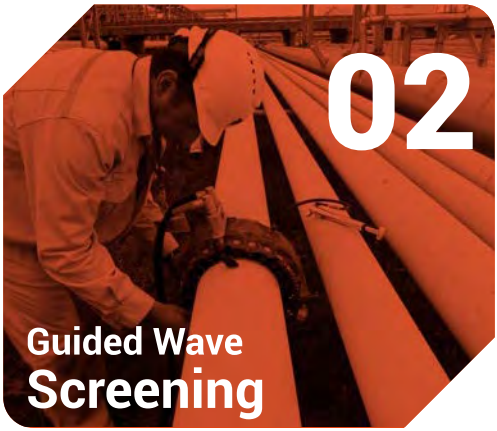
The company has its headquarters in London (UK), and offices in Houston (Texas, USA) and Kuala Lumpur (Malaysia), and a network of representatives all over the world.

"I first started the research into guided waves (Lamb waves) for plate and plate like structures over 35 years ago. My post-graduate research was directed towards using guided waves for the inspection of pipes, primarily as a screening method. Further research improved the method to the point it was possible to manufacture a system that could be taken on site.

The first guided wave system was built in 1996 and since then, research and development has never stopped. Although the equipment and the office are unrecognisable as the same company, the people have remained and have been joined by a growing number of young, enthusiastic and talented professionals. This has helped GUL to continuously develop new and improved products, as well as to branch out into new areas, in response to the needs of our long standing partners in the inspection industry.

It has been a joint effort between GUL and our partners in this new and expanding part of the asset integrity industry, which has helped to deliver a first-rate service to major energy and power companies around the world."

Dr David Alleyne
CEO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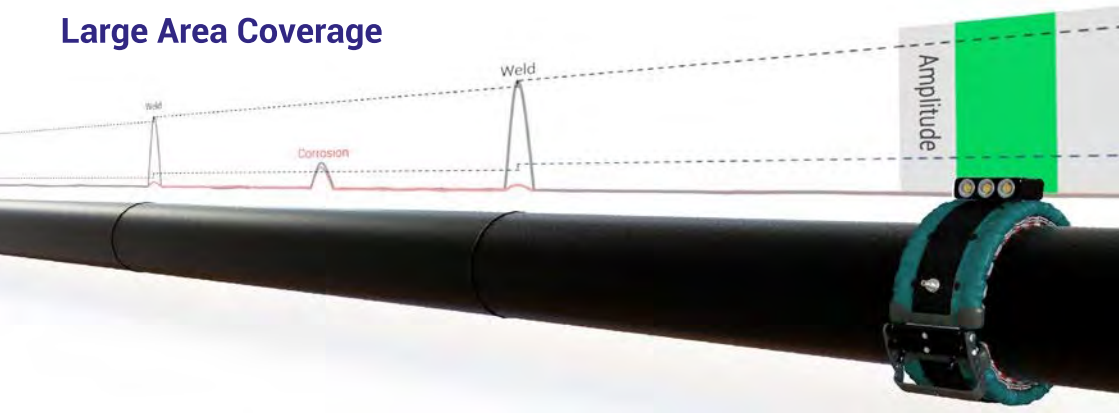
SCREENING

The Wavemaker® System is the most powerful and reliable long-range guided wave screening equipment in the market. An efficient solution for many inspection challenges: regular repeat inspections, in-service inspections, difficult-to-access piping, road crossings, buried pipe, high-temperature piping, and many others. Typical pipe screening applications include:

- Corrosion under insulation
- Corrosion under pipe supports
- Internal corrosion
- Weld defects
- Erosion
- Pits under sludge

Large Area Coverage



WAVEMAKER® G4MINI

The Wavemaker® G4mini system is designed to quickly inspect 100% of the volume of long lengths of pipelines from one position.

The Wavemaker® G4mini offers all of the traditional Wavemaker® features and some new ones in a small (22 x 30 x 13 cm) and lightweight package.

The G4mini automatically recognises the sensor and allows the inspector to very quickly configure the test options, ensuring best data quality.

- Lightweight 4.5 kg / 9.9 lbs
- Removable Battery
- Boost Function (400 V)
- 16 Data Channels
- 7" LCD Touch Screen
- Fast Ethernet Collection
- High Speed Data Acquisition
- On-Board Diagnostics
- Built-In GPS
- Extended Frequency Range
- Operator Identification
- Wireless Option (Accessory)

Configurations

Base

Base level instrument compatible with Solid & Inflatable Rings, and Compact® rings; suitable for most common above-ground screening applications.

Extension licenses can be added.

Full

This instrument can be used with all pipe, tube, and monitoring transduction systems produced by GUL.

Supplied with

- WavePro™ License
- 2 x 2.5 m LEMO® Cables
- Mains Charger
- USB Cable
- Soft Bag
- Ethernet Cable

Optional

- Laptop with pre-installed WavePro™
- Software modules for G4mini Base
- Wide range of LEMO® cables
- EFC Processing Licence
- In-car charger
- Absolute Calibration software
- Warranty extension options
- LAN cable adapter

WavePro™

The WavePro™ guided wave analysis software runs on a Windows® based operating system and interfaces with the Wavemaker® G4 and G4mini instrument.

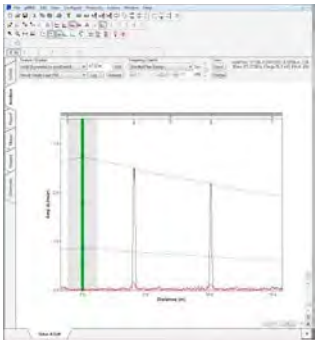
The software assists with the collection of data, the validation and analysis of the data, and the reporting of the results. Its many features simplify and speed up the inspectors' tasks while exploiting the full potential of guided wave screening.

The software continues to evolve to bring new features that enhance the capabilities of guided wave screening.

A perpetual licence for use of the software is included in the price of the Wavemaker®.

- Seamless Frequency Sweeping
- Quick Schematic
- Report Generator
- Rapid Data Processing
- Advanced Data Quality Checks
- Routine Software Updates
- User Friendly
- Multiple Connection Interface Options
- Windows® 7 to 11

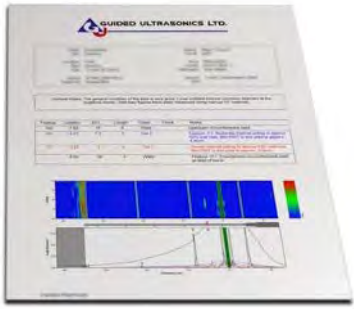
Basic Features



Amplitude Scan (A-Scan)

The main features of the A-Scan are the Distance-Amplitude Correction (DAC) curves, symmetric (black) signals & the non-symmetric (red) signals.

These features provide information about the type of features or defects, including their location along the inspected pipe length and an estimated cross-sectional change.

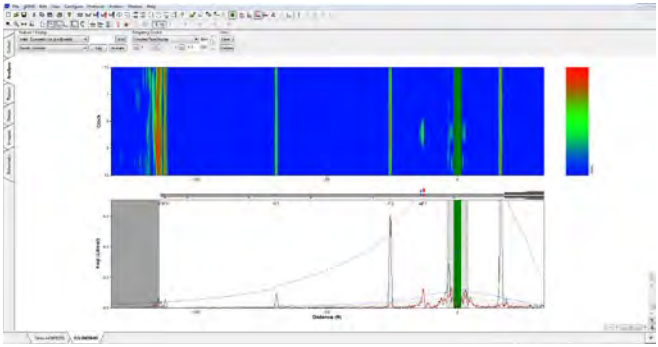


Report Generator

Once the data has been analysed by a trained inspector, the data can be automatically compiled into a single report which would include the A-Scans, reflection annotations and operator notes.

The report can be output to either PDF, Word Document or Excel Spreadsheet format for flexibility.

Enhanced Focusing Capability (EFC)

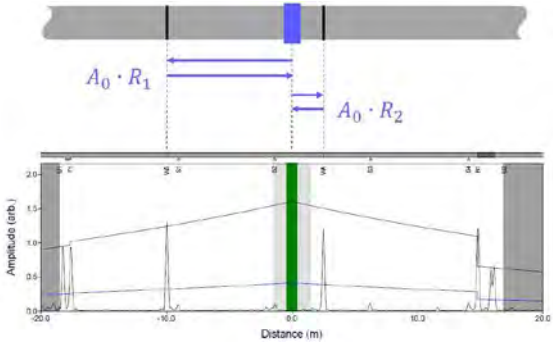


Unrolled Pipe Display (C-Scan)

Enhanced Focusing Capability (EFC) Processing Licence activates full matrix data capture (FMC) and the advanced post-processing data analysis. This capability focuses the guided wave energy allowing the software to generate an unrolled image of the pipe (C-Scan). Defects and pipe features can be more easily located, including their orientation around the pipe circumference. The example in the figure above demonstrates how a defect can be easily visualised and located on the pipe using the C-Scan.

Wavemaker® G4 / G4^{mini} | Synthetic Focusing | Orientation of Features

Absolute Calibration



A-Scan with Absolute Calibration & Simulated Reverberation

The absolute calibration licence activates the processing functionality required for automatic amplitude calibration and reverberation simulation. It calculates the DAC amplitude levels, resulting in accurate assessment of indications. The software checks whether absolute calibration is valid for a given guided wave result. The simulated reverberation feature will also assist inspectors with the identification of false echoes through the use of advanced signal processing.

Wavemaker® G4 / G4^{mini} | Amplitude Calibration | Simulation of Reverberation Echoes

Compact® Rings

The Compact® rings are designed to be lightweight and low profile while still providing excellent results. This makes them the default solution for most applications.

These rings were re-engineered, reducing weight by 35%, axial width by 30%, and radial height clearance to under 38mm. For sizes greater than 36-inch diameter, two smaller rings can be joined.

A system designed to tackle a wide range of inspection challenges, including:

- Bare / Painted Pipes
- Buried Pipes
- Sleeved or Unsleeved Road Crossing Pipes

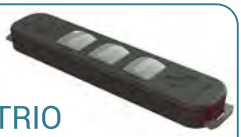
Lightweight Materials
Smart Sensors
Ring Joining
Low Profile
Advanced Materials
Easy-Fit Modules
Pneumatic Loading
Spring-Lock Latch
Ergonomic Design

Available Transducer Types

EC-30 / 42

2-row transducer modules with:

- 30 mm spacing for medium frequency inspection, or
- 42 mm spacing for low frequency inspection.



EC-TRIO

3-row transducer modules with 42 mm & 21 mm spacing for inspection across an ultra-wide band frequency range without having to swap modules.

EC-HD

2-row fixed space transducer modules with four transducers per module to inspect at a high frequency range, which increases sensitivity.

Specifications

Module Type	EC-TRIO / EC-30 / EC-42	EC-HD
Number of Channels	16	
Nominal Pipe Size (NPS)	6" to 40" (DN 150 to 1000)	
Operating Temperature	-40°C to 150°C (-40°F to 302°F)	
Radial Clearance	38 mm (1.5")	
Transduction System Compatibility	Wavemaker® G4 & G4^{mini}	Wavemaker® G4 (with MF option) & Full (or Licensed) G4^{mini}

EFC Solid Rings

The solid transducer rings are typically used for standard screening of pipes with nominal size between 2 and 8 inches in diameter. The rings are attached to the pipe by tightening the two large handles which push the spring loaded transducers onto the pipe to obtain good shear contact.

Standard rings have two rows of transducers to transmit torsional wave modes. Customised rings can be specially produced in other sizes or with 4 rows of transducers to allow for inspection using both longitudinal and torsional guided wave modes.

- Spring Loaded Transducers
- High Temperature Version Available
- Precision Milled Body
- Ergonomic Fastening Handles

Available Models

LITE

Spring-loaded transducer ring for inspection of pipes up to 6" diameter. Key application areas include:

- Bare / Painted Pipes
- Sleeved / Unsleeved Road Crossing Pipes
- Buried Pipes

HT

Similar to LITE solid ring but specifically designed to inspect higher temperature pipes (< 350°C). Key application areas are the same as the ones listed for LITE rings but also include:

- High Temperature Pipes

Specifications

Model	LITE	HT
Number of Channels	16 (*)	
Nominal Pipe Size (NPS)	2" to 6" (DN 50 to 150)	2" to 8" (DN 50 to 200)
Operating Temperature	-40°C to 150°C (-40°F to 302°F)	-40°C to 350°C (-40°F to 662°F)
Radial Clearance	76 mm (3")	
Transduction System Compatibility	Wavemaker® G4 & G4^{mini}	

(*) 12 channels for 2"

EFC Inflatable Rings

These transducer rings are designed to provide effective inspection capability, particularly for larger diameter pipes. Pneumatic pressure is used to press transducers modules (which are mounted onto this ring) against the pipe wall. These modules are fully interchangeable between inflatable collars of all sizes.

For sizes greater than 36-inch diameter, two smaller inflatable type rings can be linked together as detailed in a specific procedure for joining rings. Non-standard sizes (up to 60 inch) can be produced to special order.

Pneumatic Loading

Ring Joining

Ratchet Latch

Available Transducer Types

Standard

2-row transducer modules with a single fixed spacing for medium frequency inspection. Key application areas include:

- Bare / Painted Pipes
- Sleeved / Unsleeved Road Crossing Pipes

Adjustable

2-row adjustable transducer modules with four transducer spacings to inspect across a wide band of frequency range. In addition to standards' applications, key areas include:

- Buried Pipes
- Pipes with many welded supports
- Inspections for Localised Pitting

Specifications

Module Type	Standard	Adjustable
Number of Channels	16 (*)	
Nominal Pipe Size (NPS)	6" to 36" (DN 150 to 900)	
Operating Temperature	-40°C to 150°C (-40°F to 302°F)	
Radial Clearance	63 mm (2.5")	
Transduction System Compatibility	Wavemaker® G4 & G4mini	

(*) 12 channels for 6"

HT Inflatable Rings

High Temperature (HT) rings and modules have EFC performance with the added capability of testing pipes operating at up to 350°C, provided that the ring is removed from the pipe within 10 minutes of being applied.

In order to carry out the guided wave inspection, only a 50-cm (20-inch) wide strip of insulation needs to be removed. No couplant is required.

- Pneumatic Loading
- Ring Joining
- High Temperature Operation
- Smart Sensors
- Ratchet Latch

Available Transducer Types

HT

2-row adjustable transducer modules with four different spacings to inspect across a wide band of frequency range. Key application areas include:

- Bare / Painted Pipes
- Sleeved / Unsleeved Road Crossing Pipes
- Buried Pipes
- High Temperature Pipes

Adjustable

The 2-row adjustable transducer modules with four transducer spacings described in the EFC Inflatable Rings page can also be mounted in the HT Inflatable Rings if the full temperature range is not required.

Specifications

Module Type	HT	Adjustable
Number of Channels	16 (•)	
Nominal Pipe Size (NPS)	6" to 36" (DN 150 to 900)	
Operating Temperature	-40°C to 350°C (-40°F to 662°F)	-40°C to 150°C (-40°F to 302°F)
Radial Clearance	63 mm (2.5")	
Transduction System Compatibility	Wavemaker® G4 & G4^{mini}	

(•) 12 channels for 6"

HD Solid Rings

The High Definition (HD) solid rings have EFC performance and utilise the high frequency range available with the Wavemaker® G4^{mini} or the Wavemaker® G4 with the medium frequency option (LF+MF option) for applications where higher sensitivity and resolution are required.

Such applications typically include:

- Interface Penetrations
- Supports
- Localised Pitting

Spring Loaded Transducers

High Temperature Version Available

High Frequency Operation Capable

Precision Milled Body

Ergonomic Fastening Handles

Available Models

HD

Spring-loaded transducer ring for inspection of pipes with up to 6" diameter at a high frequency range. Key application areas include:

- Bare / Painted Pipes
- Sleeved / Unsleeved Road Crossing Pipes
- Buried Pipes
- Pipes with many welded supports
- Concrete Anchor Supports
- Inspections for Localised Pitting

HD-HT

HD solid ring specifically designed to inspect higher temperature pipes (< 350°C).

Key application areas include:

- Bare / Painted Pipes
- Sleeved / Unsleeved Road Crossing Pipes
- Buried Pipes
- Pipes with many welded supports
- Concrete Anchor Supports
- Inspections for Localised Pitting
- High Temperature Pipes

Specifications

Model	HD	HD-HT
Number of Channels	16	
Nominal Pipe Size (NPS)	3", 4", 6" (DN 80, 100, 150) (*)	
Operating Temperature	-40°C to 150°C (-40°F to 302°F)	-40°C to 350°C (-40°F to 662°F)
Radial Clearance	51 mm (2")	
Transduction System Compatibility	Wavemaker® G4 (with MF option) & Full (or Licensed) G4^{mini}	

(*) For 2.5" & under check Claw Transducers

HD Inflatable Rings

The HD inflatable ring has been developed for the same applications as the HD solid ring where higher sensitivity and resolution are required, and pipe sizes are larger than 6 inches.

When mounted with HD transducers, the use of this type of ring requires the Wavemaker® G4^{mini} or the Wavemaker® G4 with the medium frequency option (LF+MF option).

- Pneumatic Loading
- Ring Joining
- High Frequency Operation Capable
- Smart Sensors
- Ratchet Latch
- Enhanced Circumferential Sensitivity

Available Transducer Types

HD

2-row fixed space transducer modules with four transducers per module to inspect at a high frequency range. Key application areas include:

- Bare / Painted Pipes
- Sleeved / Unsleeved Road Crossing Pipes
- Pipes with many welded supports
- Concrete Anchor Supports
- Inspections for Localised Pitting

Adjustable

The 2-row adjustable transducer modules with four transducer spacings described in the EFC Inflatable Rings page can also be mounted in the HD Inflatable Rings to cover a wider range of applications:, for example:

- Buried Pipes
- Pipes with general corrosion

Specifications

Module Type	HD	Adjustable
Number of Channels	16	
Nominal Pipe Size (NPS)	6" to 36" (DN 150 to 900)	
Operating Temperature	-40°C to 150°C (-40°F to 302°F)	
Radial Clearance	63 mm (2.5")	
Transduction System Compatibility	Wavemaker® G4 (with MF option) & Full (or Licensed) G4^{mini}	Wavemaker® G4 & G4^{mini}

Claw Transducers

The Claw System is a breakthrough probe development designed for efficient boiler tube inspection, especially in restricted access scenarios.

Different transducer spacing options are available.

The Claw transducers are suitable for low frequency guided wave inspection of:

- Boiler Tubes
- Heater Tubes
- Furnace Tubes

Tube Applications

High Frequency Operation Capable

Spring Loaded Transducers

Precision Milled Body

Ergonomic Fastening Handles

Available Models

Model	Minimum OD	Maximum OD	Suitable for **Tube** Size	or	**Pipe** Size
R2G19	17 mm	22 mm	0.75"		-
R2G25	23 mm	28 mm	1"		0.75"
R2G31	30 mm	35 mm	1.25"		1"
R2G38	38 mm	43.2 mm	1.5"		1.25"
R2G44	43.5 mm	48.5 mm	1.75"		1.5"
R2G50	47.5 mm	52.5 mm	2"		1.5"
R2G57	55.5 mm	60.5 mm	2.25"		-
R2G63	59.5 mm	64.5 mm	2.5"		2"

Specifications

Number of Channels	8
Nominal Pipe Size (NPS)	¾" to 2.5" (DN 20 to 65)
Operating Temperature	-40°C to 250°C (-40°F to 482°F)
Radial Clearance	38 mm (1.5")
Transduction System Compatibility	Wavemaker® G4 (with MF option) & Full (or Licensed) G4^{mini}

Slinky

Low Profile Rings

The ultra low profile ring or "Slinky" was specifically designed to be able to fit around pipes that have a very limited radial clearance, like those commonly found in culverts or pipe racks. Typically less than 25 mm of clearance is required to be able to mount the rings.

Due to their design, Slinky rings cover a smaller pipe size range than traditional solid rings.

Standard low profile rings are configured for API nominal pipe sizes, within API 5L tolerance. These ultra low profile transducer rings are suitable for low clearance inspection of:

- Bare / Painted Pipes
- Sleeved Pipes
- Insulated Pipes

Low Profile

Precision Cast Body

Ergonomic Handles

Available Transducer Types

Green

2-row transducer modules with a single fixed spacing for high frequency inspection.

Blue

2-row transducer modules with a single fixed spacing for medium frequency inspection.

Red

2-row transducer modules with a single fixed spacing for low frequency inspection.

Specifications

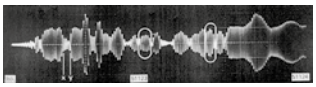
Number of Channels	8 or 16
Nominal Pipe Size (NPS)	2" to 8" (DN 50 to 200)
Operating Temperature	-40°C to 120°C (-40°F to 248°F)
Radial Clearance	25 mm (1")
Transduction System Compatibility	Wavemaker® G4 & Full (or Licensed) G4^{mini}

GUIDED ULTRASONICS LTD. TIMELINE

1986

Result of first attempt without a full understanding of guided waves.

Source: Bartle, P. M. (1987). "Acoustic pulsing monitoring: principles operational requirements and potential," The Welding Institute, Abington, Cambridge



1992

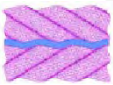
Transducer ring, early site test (circa 1994)

1994

Dolphin Lab System developed.

1996

Method and Transduction patented by Imperial College (Alleyne & Cawley).



Disperse software released (Lowe & Pavlakovic).

1998

Claw transducer tube inspection

2000

2008

gPIMS® Corrosion Monitoring s
Starts the revolution.

2010

High Temperature rings released. Can be used on pipes at 350°C.

2011

Modular range of sub-sea rings first used.

2012

Wavemaker® G4 launched. Introduces new advances in Guided Wave Testing.

Patented absolute calibration routine introduced (GUL).

2014

Wavemaker ® G4mini launched. Lightweight and powerful.

2016

Compact® rings launched. Lightweight, fast, efficient, and reliable.

2017

Patente
Short F
device.

Gro

High Definition rings released. Improved performance for small defects.

WavePro™ software developed based on site experience and customer feedback.

Guided Ultrasonics Ltd. is formed in 1999. Malcolm Russell is elected first chairman.

SE16 System launched.

Rail inspection development started.

1999 **2000**

First PIMS installed.

2004

First sub-sea inspection

2007 **2005**

Unrolled Pipe Display and focusing released in WavePro™.

Wavemaker® G3 launched.
Set the standard for Guided Wave Testing for almost a decade.

Tube inspection tool developed and released.

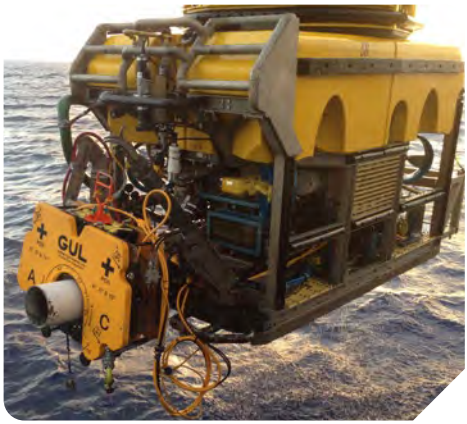
2018 **2020** **2022**

Studio Suite™ launched.
From Sensor to Desktop.

Launch of the QSR® Axial Scanner. Opening up more possibilities...

QSR1® launched.

gPIMS® FCU launched. Autonomous Monitoring.



Subsea GWT

With the experience gained from many inspections in both the North Sea and the Gulf of Mexico, GUL's Subsea GWT equipment has evolved into a reliable modular system.

GUL Subsea rings are easily adjusted to fit different pipe sizes, and are available for both ROV or diver deployment.

The advantages of using the Sub-Sea rings include:

- Screening unpiggable sections of line for internal or external corrosion/erosion.
- Screening under weight coat and insulation with minimal cleaning and excavation.
- On-site analysis allows the ROV to perform follow up indications.

Available Deployment Types

ROV Deployed

A Subsea G4mini is mounted on the ROV. A hydraulic connection is used for opening and closing the ring. The test is carried out from the ROV control room.

Diver Deployed

The test is controlled via an umbilical from a topside interface box to the Wavemaker instrument. The rings are installed on a clean section of pipe by 1 or 2 divers using a mechanical clamping mechanism.

Specifications

Deployment Type	ROV	Diver
Number of Channels	12	12
Nominal Pipe Size (NPS)	6" to 10" (DN 150 to 250)	4" to 26" (DN 100 to 650)
Operating Depth	Down to 3,000 msw	Any diver depth
Transduction System Compatibility	Wavemaker® Subsea G4^{mini} only	Wavemaker® G4^{mini} (< 50m depth) Subsea G4^{mini} (> 50m depth)

G-Scan

Rail Track Screening

The G-Scan is a long range, rapid rail inspection system which is deployed on rail tracks during normal operation. This system uses low frequency guided waves which can travel along the rail and detect defects, such as corrosion, at any location throughout the section including the foot of the rail. The G-Scan is only compatible with the Wavemaker® G4 (32 channels required).

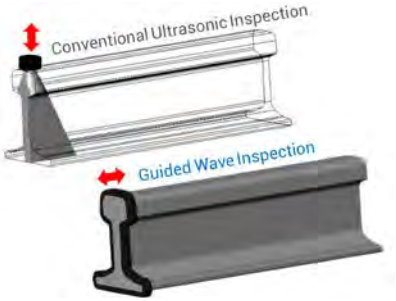
The G-Scan is ideally suited for low frequency guided wave inspection of:

- Level crossings
- Tunnels
- General rail screening
- Rail welds of all kinds

Principle of Operation

A structure can support many guided wave modes at any given frequency. Each mode carries the guided wave energy in different parts of the rail cross section. Using several modes simultaneously, the entire rail cross section can be inspected in a single test. In addition, by examining which mode is reflected from a defect, it is possible to determine in what part of the rail cross section the defect is located.

Example of guided wave mode shapes with energy concentrated in the foot (left) and web (right) of the rail respectively.



Unlike conventional ultrasonic inspection, guided waves provide 100% volumetric inspection and can inspect tens of metres in a single test.

Specifications

Number of Channels	26
Rail Sizes	CEN60, CEN56, CEN54, CEN50
Operating Temperature	-40°C to 120°C (-40°F to 248°F)
Transduction System Compatibility	Wavemaker® G4

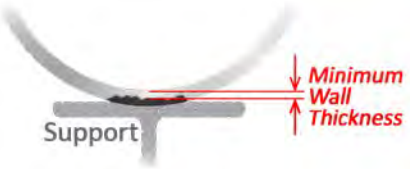
SCANNING

QSR® is the first quantitative guided wave system. This Quantitative Short Range (QSR) method scans short sections of pipe for independent verification and prove-up. The patented analysis technique permits quantitative measurement of the remaining wall of the inspected area without needing to get direct access to it and with minimal surface preparation required.

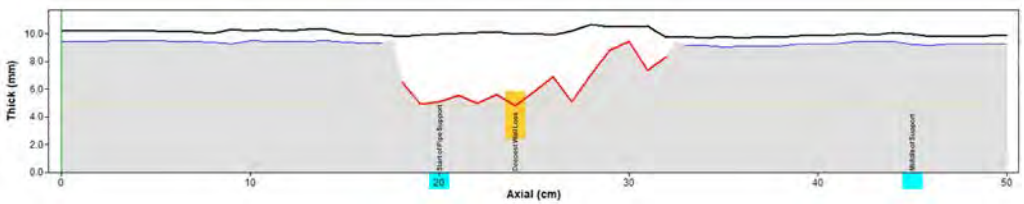
For example, an inspector can quantify Corrosion Under Pipe Supports (CUPS) without lifting the pipe, measure wall thickness under external corrosion scabs without disturbing them, and inspect wall penetrations.

The QSR® systems automatically measure:

- Average Wall Thickness
- Minimum Remaining Wall Thickness



The results are presented as a thickness profile of the scanned section:



WavePROQSR™

The WaveProQSR™ software controls the real time configuration and collection of data. After collection it validates and helps analyse the data, allowing the user to report the results.

WaveProQSR™ runs on a Windows® based operating system, and interfaces with the QSR® instrument via USB or Ethernet connection.

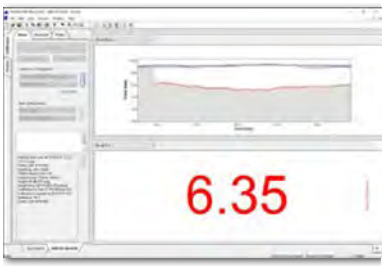
- Automated Configuration
- Rapid Data Processing
- Reporting & Exporting Functions
- Advanced Data Quality Checks
- Routine Software Updates
- Windows® 7 to 11

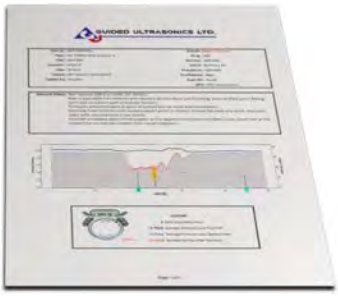
SCANNING STUDIO

WaveProQSR™ seamlessly interfaces with the Scanning Studio, a cloud-based platform that provides inspectors invaluable assistance in the analysis, validation, and reporting of results; leading to enhanced consistency and improved efficiency.

QSR ASSIST

Basic Features





Automated Configuration

The WaveProQSR™ routines automatically optimise the instrument configuration for the detected pipe diameter, pipe wall thickness, and coating, minimizing These routines minimize configuration errors and setup time.

As the system scans, the software continuously adapts to collect the optimum data set for each location along the pipe.

Reporting & Exporting

The system records the average wall thickness as well as the minimum wall thickness for each scanned location.

This defect profile forms the base of the report and can also be exported to a spreadsheet for FFS calculations.

QSR1®

The QSR1® device incorporates the latest guided wave quantitative short range (QSR) technology and hardware.

The QSR1® moves axially along the top of the pipe, sending guided waves around its circumference to generate a thickness profile of the area of interest. The system provides a quantitative measure of the average wall, as well as the remaining pipe wall thickness.

- Lightweight 12 kg / 26.5 lbs
- Removable Battery
- Robust Design
- High Speed Data Acquisition
- 7" LCD Touch Screen
- Semi-Automated Scanning
- Extended Frequency Range
- Operator Identification
- Built-In GPS

Supplied with

- WaveProQSR™ License
- USB Cable
- Ethernet Cable
- Transport Case

Specifications

Nominal Pipe Size (NPS)	6" to 24" (DN 150 to 600)
Pipe Thickness	6 mm to 13 mm (0.236" to 0.512")
Operating Temperature	-20°C to 70°C (-4°F to 160°F)
Communications	USB, LAN
Clearance	Varies according to diameter. Special frames available for limited clearance.

QSR® AXIAL

The QSR® Axial combines with the QSR1® electronics pod to send guided waves axially along a pipe.

This orientation allows even further applications for the QSR® System, like clamped supports, wall penetrations, and air-ground interfaces.

- Lightweight 9 kg / 20 lbs
- Low Profile
- Semi-Automated Scanning

The Traction Unit allows for Motorized Scanning of pipes between 6" and 16" (DN 150 to 400) in diameter.

Supplied with

- Transport Case
- QSR® ePOD Adapter Cable

Specifications

Nominal Pipe Size (NPS)	**Manual Scan:**	4" to 36" (DN 100, DN 450 to 900)
	Motorized Scan:	6" to 16" (DN 150 to 400)
Pipe Thickness	6 mm to 15 mm (0.236" to 0.590")	
Operating Temperature	-20°C to 70°C (-4°F to 160°F)	
Clearance	**Sensor:**	Less than 28 mm (1.1")
	Traction Unit:	Less than 85 mm (3.4")

MONITORING

Continuous monitoring of pipework for corrosion and erosion provides insight into the impact of operating decisions on the integrity of that pipework. This insight enables better-informed decisions that enhance profitability and compliance.

GUL's Monitoring Systems achieve this by:

- permanently installing robust sensors on the pipe,
- collecting data using a variety of either temporary or permanent electronics,
- processing the data with analytical software embodying Guided Ultrasonics' decades of expertise in GWT Analysis,
- serving up the resulting asset condition information in Monitoring Studio, and
- providing for the export of this information to historians, to facilitate correlation of changes on condition with changes in operating conditions.

This combined system allows us to collect frequent data that improves responsiveness, sensitivity, and reliability. The system is not only capable of tracking the thickness at the sensor location, but can uniquely also provide large area coverage that can discover any randomly occurring defects away from the sensor.

Area Monitoring data visualized on GUL Studio: Easy-to-understand pipe condition tracking.

Monitoring Studio

The Monitoring Studio is a user friendly way to view the data generated by our monitoring systems, analyse it for information such as corrosion rates, and generate reports.

It is a secure cloud-based portal that allows an inspection engineer easy access to data they need from their desktop or mobile devices.

The platform includes:

- Data management
- Data interpretation
- Audit & Data review
- Powerful analytics
- Secure data storage
- Secure data export

Dual Capability

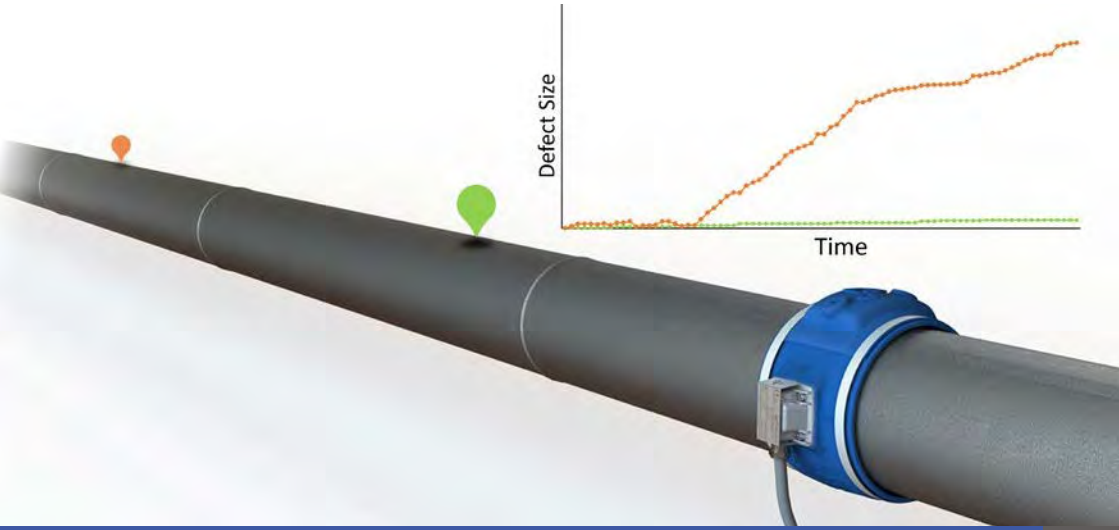
Small Area Thickness Monitoring

The wall thickness underneath the sensor can be tracked in 8 segments around the circumference of the pipe.

The guided wave method used by gPIMS® is tolerant of rough corrosion surfaces and is accurate to within tens of microns.

Large Area Corrosion Monitoring

Corrosion can be detected and tracked anywhere within the diagnostic length along the pipe. Frequent data collection and advanced signal processing - via the GUL Monitoring Studio - achieves sensitivities better than 1% cross-section change.



gPIMS® FCU

The Field Control Unit (FCU) samples data from gPIMS® Sensors which provide both thickness and large area monitoring data.

The gPIMS® FCU collects data automatically without the need for a Wavemaker® instrument nor a standard orange connection box. This unit can be retrofitted to most existing models of gPIMS® Sensors.

- ATEX / IECEx version available
- Automatic Collection
- Rechargeable Battery (for non-EX)
- Dual Capability Thickness Monitoring
- Solar Recharge Option (for non-EX)
- GUL Monitoring Studio

Available Configurations

USB

A unit designed for periodic manual data retrieval. The unit stores a copy of the collected data in an easy-to-access USB Key.

4G

Designed for autonomous data upload, this unit is supplied with an active 4G SIM Card that works in most countries.

EX

An ATEX/IECEx certified unit for use in hazardous atmosphere restricted areas, designed for autonomous data upload via Wi-Fi network.

Specifications

Configurations	USB	4G	EX
Number of Channels		16	
Sensor Compatibility	gPIMS® Sensors		gPIMS® EX Sensors
Typical Battery Life	500 Collections	250 Collections	500 Collections
Solar Panel Charging	Compatible with GUL Supplied Panel		Not Available
Cellular Modem (LTE/UMTS/GSM)	--	Queltec EG21-G	--
Internal Data Storage	Minimum 8GB (Archives last 2000 Collections)		
Removable Data Storage	USB Key	USB Key	--
Configuration Interface		Wi-Fi	

gPIMS® Sensor Rings

The gPIMS® sensor rings are an environmentally robust range of sensors developed to be easily bonded onto the pipe, sealed and then left in place. All gPIMS® sensors are able to provide both small area (thickness monitoring under the sensor) and large area (guided wave) monitoring data.

A cable connects the gPIMS® sensor to the Automated Field Control Unit (FCU), or to an easy-to-access connection box.

A connection box requires a Licensed Wavemaker® configured for repeat testing to obtain data. The instrument detects the data collection settings, so it can be used by operators with minimal training.

- Low Profile
- Smart Sensors
- Dual Capability
  Thickness Monitoring
- ATEX / IECEx version available
- Advanced Materials
- Efficient Installation
- GUL Monitoring Studio
- Environmentally Protected
- Save Costs

Available Models

EFC

A 16-channel gPIMS® ring kit for applications in higher consequence areas that do not require hazardous area certification.

EX

An ATEX/IECEx certified 16-channel gPIMS® ring kit for use in restricted areas where hazardous atmospheres may be present.

Specifications

Model	EFC	EX
Nominal Pipe Size (NPS)	3" to 72" (DN 80 to 1800)	6" to 48" (DN 150 to 1200)
Pipe Thickness	3 mm to 50 mm (0.118" to 2")	
Operating Temperature	-40°C to 90°C (-40°F to 194°F) / 130°C (266°F) with special order	
Radial Clearance	25 mm (1")	
Sensor Axial Length	200 mm (8")	

TRAINING

As with all inspection methods, good training of guided wave inspectors forms a critical part of the development of the technology. Experienced, skilled inspectors can make a significant difference in how useful results are to the end client. Therefore, GUL has always been fully committed to developing and improving quality training modules that allow inspectors to learn as effectively as possible.

GUL has trained over 3,000 inspectors globally and continues to host more than 50 training courses each year. Both classroom and on-site training are available.

Appreciation Course

One-day introductory level course which aims to provide an introduction to the guided wave testing (GWT) method and to the screening of pipes using the GUL Wavemaker® system.

Course Content

- Introduction to Guided Ultrasonics Ltd.
- Guided Wave Testing Basics
- Guided Wave Monitoring
- Guided Wave Inspection Savings
- GUL Training and Support
- Guided Wave Testing Case Studies

Level 1 P

Suitable for NDT inspectors new to the field of **Guided Wave Testing** (GWT) (40 hours).

Course Content

- Level 1 guided wave theory
- Introduction to Wavemaker® system
- Introduction to WavePro™ Software
- Selection of test parameters
- Basic data interpretation
- Basic reporting

Recommended Qualifications

- Experienced Level 2 UT technician, or
- Degree or HNC in a technical subject

Level 2 SP

Advanced application specific training course for the inspection of **Supports and Process Pipework** (40 hours).

Course Content

- Advanced equipment configuration
- Advanced data collection
- Advanced calibration
- Inspection of supports
- Inspection of welds & pipe fittings
- Detailed review of Level 1 work

Requirements

- Level 1 Pipe qualification
- 6 months of on-site experience

Level 2 XB

Advanced application specific training course for the **Inspection of Road Crossings and Buried Pipes** (40 hours).

Course Content

- Advanced data interpretation
- Advanced data collection protocols
- GWT of buried pipes
- GWT of pipes under road crossings
- Pitch & catch configuration
- Combining transducer rings

Requirements

- Level 1 Pipe qualification, and
- 6 months of on-site experience

Level 1 Q

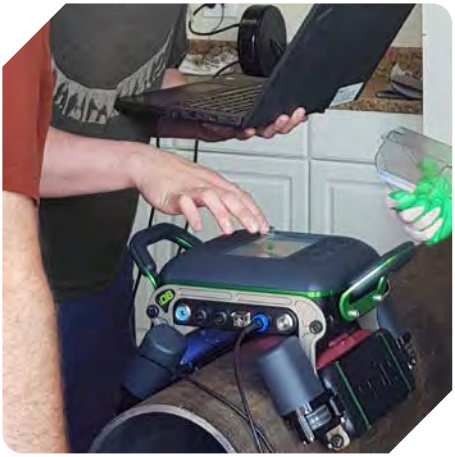
Suitable for NDT inspectors new to the field of **Guided Wave Scanning** using the QSR® (16 hours).

Course Content

- Guided wave theory
- Introduction to QSR1® Scanning System
- Introduction to WaveProQSR™ Software
- Data Collection Procedures
- Basic data analysis
- Basic reporting

Recommended Qualifications

- Experienced NDT technician (1 year), or
- Experienced Level 2 NDT technician, or
- Degree or HNC in a technical subject



Level 2 QT

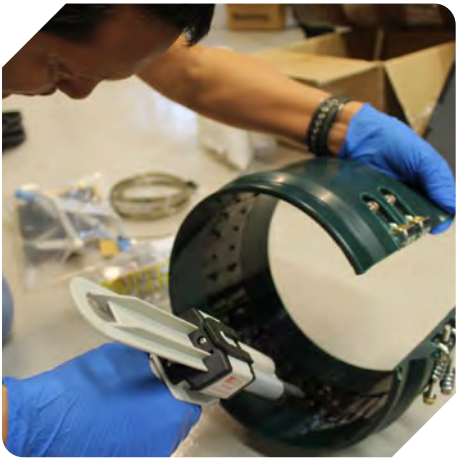
Advanced application specific training course for the **Inspection of Touchpoint Supports** (16 hours).

Course Content

- Advanced equipment configuration
- Advanced data collection
- Advanced data analysis
- Reporting

Requirements

- Level 1:Q qualification, and
- Degree or HNC in a technical subject, or
- Valid Level 2 or 3 UT qualification



Level 2 PM

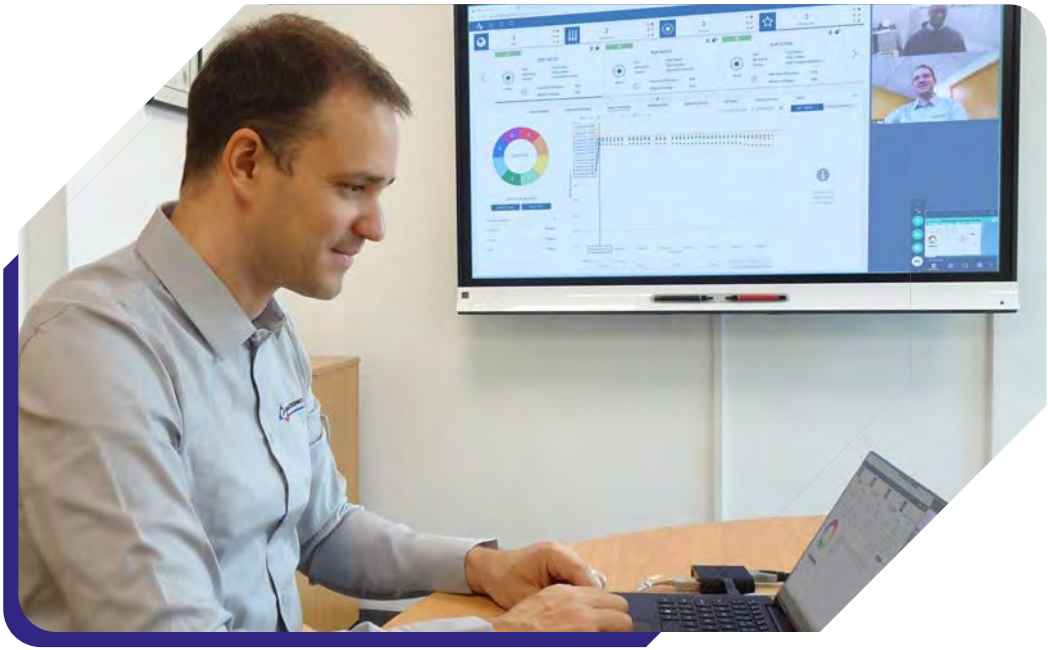
Advanced application specific training course for the **Installation of the gPIMS® Corrosion Monitoring System** (32 hours).

Course Content

- Introduction to gPIMS®
- Guided wave monitoring
- Installation of gPIMS®
- Practical session

Requirements

- Level 1 Pipe qualification
- 6 months of on-site experience



SERVICES

Consultancy

Our clients can benefit from the extensive experience GUL has gathered in the field of guided waves over decades. Inspection procedure development, signal data review and advanced numerical modelling are among the consultancy services which we can provide.

Our many high-profile industry research and development projects have enabled us to confidently handle bespoke customer requirements. Our experts are available to provide on and off-site support around the world.

At a Glance

- Audit & Data review
- On and off-site support
- Procedure development
- Bespoke developments
- Modelling

Equipment Services

GUL operates an equipment rental business to assist our existing clients in the delivery of top quality inspection services.

We provide equipment calibration and maintenance services to ensure that our clients' equipment are always performing optimally.

Our customers can count on our dedicated team of technicians to provide prompt and competitive equipment repair services.

- Rental
- Repairs
- Calibration
- Maintenance

25 YEARS
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