USL Ultrasonic Sciences Ltd

THE QUEEN'S AWARDS FOR ENTERPRISE: 2015

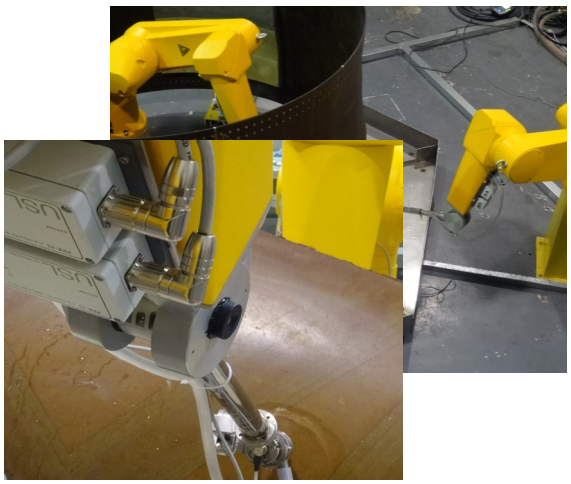
Robotic ultrasonic scanning systems

Top left: Dual robots for complex geometries.
Lower left: 18 axis dual robot system, 30m long

Top right: Pulse echo inspection system
Lower right: Dry-coupled phased array roller probe system

- Systems up to 30 metres long
- Single and dual robot configurations
- Contour following systems for complex curves with CAD input for generation of scan path
- High speed scanning alogorithms unique to USL
- Exceptional dynamic range using logarithmic receivers and remote pulser preamplifier
- Multiple gate acquisition and display in real time
- C scan, B scan, thickness mapping and full RF acquisition
- Simultaneous dual frequency option

USL offers both traditional and robot based ultrasonic inspection systems for pulse echo and through transmission inspection. We have developed unique motion control and software systems which enable us to by-pass the normal slow positional feedback from standard robots. The result is that we can achieve linear scanning speeds as fast as cartesian systems.



Dual robots with a turntable system for inspection of roto-Symmetrical structures.

Motoman robot system for propeller blade inspection using squirter yoke with tool changer for immersion testing of root.

A typical specification for a through transmission squirter system comprises:

- Dual Staubli RX160L robots
- Staubli CS8C robot controller
- Dual X axis linear rails
- Power PMAC motion controller
- USL high speed hardware and software
- USL multi-mode / multi-gate ultrasonic system
- Computer controlled water circulation system

System features

Mechanical

- Staubli RX160L 6 axis robots for high speed scanning applications.
- Integration with robots from other suppliers for less demanding applications.
- High quality X axis linear bearing rails with helical rack and pinion drive system.
- Scanning speed up to 1m/sec.
- Optional turntable and rotate axes.
- High quality linear bearings with permanent lubrication.
- Exceptional resolution and repeatability.
- Sand filtration and UV treatment of water, with active flow control.

Scan control

- Unique USL developed motion control with 2kHz position feedback rate

Ultrasonics

- Fully integrated PC-based ultrasonics, data acquisition and motion control.
- High power pulser for optimum penetration.
- Remote Pulser preamplifiers for exceptional S/N ratio.
- Simultaneous log and linear data acquisition.
- Through transmission and pulse echo data in the same scan.
- Logarithmic receiver for wide dynamic range - instantaneous 95dB, total >120dB.
- High speed A-D conversion and processing.
- Multi-channel and dual frequency options for simultaneous low and high frequency scanning.
- Up to 8 independent gates per channel - amplitude and time of flight monitoring
- Frequency from 0.2MHz to 35MHz

Software

- Windows 7 based software.
- True simultaneous multi axis motion control for complex shapes.
- High refresh rate digital RF/A scan.
- C scan imaging from multiple gates simultaneously.
- Full RF data acquisition and processing, including B scan capability.
- On screen measurement and analysis.
- Sophisticated image processing functions.
- 3D image manipulation.
- Interfaces to network and offline computers.
- CATIA/CAD generated scan profiles.

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