Leaders In Automated Ultrasonic Testing

Immersion Tanks
Large Gantries
Custom Systems
SDI-MasterScan Motion Control and WinScan Analysis

The SDI MasterScan/WinScan suite is one of the most powerful motion control and acquisition packages available. The well structured modular software has evolved by incorporating customer’s motion control and acquisition requests into the standard product. All new software is rigorously tested by Talon Test Laboratories before being released. With a user base of over 100 systems, incorporating the suggestions of technicians who spend all their time operating our equipment has resulted in the most versatile, user friendly, package in the industry. Targeted primarily at high volume test lab users, the principal operational criteria are ease of use and fastest possible inspection times. In addition to numerous custom systems, the SDI standard product range of over 14 system types are employed in three main industry areas:

**Precision Turntable Disk Inspection Systems**

In addition to being approved by all major aero-engine manufacturers, the following advanced features of SDI systems give major advantage over competitor’s equipment in terms of ease of use and inspection setup and test time;

- Automatic multi-transducer inspection with different transducers on dual search tubes performing simultaneous or sequential independent scans on the same part.
- Multiple scan inspection with a series of scans being performed without operator intervention. Each scan can have a different instrument setting and produces a different data file. The scan sequence, or script, can include automatic DAC setup, and transducer characterization. Instrument parameters, such as gate position and gain, can be changed during the scan at rep rate speeds and coordinated with the motion.
- System functional axes where the operator is able to move the transducer along its axis, or change the angle of incidence without moving the sound entry point, with a single control.

**Complex Contour Composite Scanners**

SDI’s range of high performance complex 3D scanners is able to perform simultaneous through transmission and pulse echo inspection on complex 3D composite parts. Advanced features include;

- Automatic teaching of component scan plans.
- Automatic normalization and water path adjustment.
- Import/Export of scan plans to CAD.
- Nested scan plans where multiple parts in different locations can be tested in the same sequence.
- Automatic identification of defects with the cluster analysis feature.

**Raw Material Inspection Systems**

SDI’s range of heavy duty plate and bar and billet inspection systems are designed for operation in harsh environments using sealed touch screen controls an air conditioned control enclosures. Typical examples are bar systems with multi-transducer bar followers performing multizone inspection on 16000# round billets and plate inspection systems with up to 32 simultaneous data acquisition channels.
SDI-MasterScan Motion Control

The SDI MasterScan is a Microsoft Windows® based high-speed, multi-axis, coordinated motion control package targeted at large scale production inspection and test lab applications. Developed by SDI for its extensive range of ultrasonic systems, MasterScan is installed on products ranging from small lab scanners to precision tanks and through transmission gantries. MasterScan is used with a range of ultra low noise dc servo products designed and manufactured by SDI specifically for demanding ultrasonic applications. The MasterScan control package, working with WinScan acquisition and analysis, acquires data from up to 8 channels with both through transmission and pulse echo curve following capability. For curved scans the scan index increment is measured along the surface of the part being tested. The package provides such features as ‘stop on defect’, ‘return to defect’, ‘chain scanning’ and ‘scan scripting’. The front end user interface, configured to match the application, ranges from a simple touch screen controller for bar scanners, to full featured controls for 3D through transmission contour following. Scan profiles are taught using the front surface echo. The 3D versions are supplied with an integrated industry standard CAD package for scan plan verification and alternative data input. SDI systems are designed to function with a wide range of third party flaw detectors. Instrument setups can be stored with the scan plan for a number of Krautkramer and Staveley NDT instruments. For scripted scans, with multiple inspection sequences, a series of scans with different instrument setups are performed sequentially without operator intervention. Each scan produces a separate data file with automatic file-name generation. When used with the SDI-2460 programmable flaw detector, instrument parameters can be changed ‘on-the-fly’ as part of the scan plan. e.g. a gate can be set up to follow the back wall of a part with rapidly changing thickness, or follow a bond line under similar conditions.
SDI-WinScan Acquisition and Analysis

SDI's WinScan® is one of the most versatile ultrasonic acquisition and analysis packages available for production inspection and defect evaluation. Approved and used by all major aerospace prime contractors, the extensive features, intuitive operation and flexible data input alternatives have made it a popular choice for analysing and printing data acquired from a variety of sources. In standard configuration WinScan captures up to eight channels of 12 bit peak detected data in C-scan format. Defect evaluation, using the MiniScan feature, provides B-scan and full waveform capture features. The number of palette levels and palette colors are operator selectable. Data can be displayed as percent of full scale, in dB or scaled for use with log amplifiers. Bipolar data display is provided for Eddy Current applications. Displayed data can be compressed, zoomed and panned. Analysis features include line cursor measurement, image enhancement, region of interest (ROI) histograms, signal to noise ratio measurement and cluster analysis. During analysis indications can be annotated with a marker. The marker position and the comments are stored with the data file. If the part is still in the scanner, the transducer can be sent to a defect indication for further evaluation with the transducer following the part contour. If defect evaluation is required while the test is in progress, it is possible to pause the acquisition while the transducer is jogged over an indication for evaluation. When completed the acquisition can continue from the original pause location or from the current position. The WinScan package offers extensive reporting and printing capabilities. The high-quality illustrated documents produced can be printed on any printer or plotter with a Windows driver. WinScan also has the capability of plotting selected areas of the scan at any even integer scale from 1:8 to 8:1 allowing test results to be overlaid on the component being inspected. WinScan is fully compatible with the Windows local area network. This means that adding a second PC with access to shared disks and peripherals over the network can enhance the system performance. This would be advantageous when carrying out high volumes of data analysis and report generation while scanning other components. The real time analysis feature allows data from a component being inspected to be analyzed before the scan is completed.
The SDI-5100 Compact Industrial Tanks are high performance rugged systems, designed for use in harsh industrial environment such as high volume test labs. These units are the industry workhorse for small to medium turntable applications. In numerous test labs across the US these units are working multiple shifts six days a week. The compact units are built from extruded aluminum section with ground stainless steel ways. X and Y axis drives are precision lead screw or toothed belt depending on speed and precision requirements. The control station is either a desktop or rack-mount PC with 19” LCD monitor. All models can be equipped with turntables, rotators and dual motorized gimbals. These units have all the features of the larger tank systems for parts up to 3 ft. diameter. These systems and are fully approved for aero engine component and composite inspection by the major aerospace primes. The high speed horizontal composite scanner provides high throughput and rapid evaluation of flat or slightly curved composite panels.
SDI's Standard 5300 series tanks are the most cost effective solution available for scan envelopes up to 8 feet and turntables inspecting parts up to 5 feet diameter weighing up to 5,000#. These rugged stainless steel systems are extensively reinforced for heavy loads and punishing operating conditions. Available with single or dual search tubes, these systems are used by all sectors of the aerospace industry for composites and forging inspection. The compound contour following capabilities are widely used for the inspection of fan blades and solid composite laminates.
SDI is a major producer of large scale systems to the aerospace and raw material industries. The 5400 series precision immersion tanks have been supplied with dual bridges and turntables mounted on lift platforms inspecting components weighing up to 7000#. The 5700 series gantry systems, installed in numerous aerospace production facilities, perform simultaneous through transmission and pulse echo from each side of composite components while following complex 3D contours. The 5200 series bar inspection systems perform multi-zone inspection on bars weighing up to 16000#. SDI has also produced a number of tube, cylinder and plate inspection systems to meet exacting customer requirements.
30 Years Experience

SDI is a leading manufacturer of automated ultrasonic inspection systems. It was formed in 1994 by a group of NDT engineers who had been manufacturing automated UT systems for over thirty years, formerly as Staveley Aerospace Systems, Qualcorp, and Automation Industries. SDI operates from a 35,000 sq ft business park unit in Camarillo, California. In addition to sales, design and administration offices, the facility houses a large-scale manufacturing facility and machine shop and a fully equipped applications laboratory. All aspects of product design and manufacturing are carried out in house. In addition to the UT systems, SDI manufactures a range of specialized UT instrumentation and motion control products.

Extensive Product Range

SDI has an installed user base of over 100 of its 5000 Series immersion tanks with numerous users purchasing several systems. The SDI-5000 series are precision ultrasonic immersion inspection systems used in facilities ranging from colleges and laboratories to harsh industrial environments. System control is achieved using the SDI-MasterScan motion control software and the SDI WinScan acquisition and analysis package running on an industrial PC platform under the Windows operating system. All systems are based on well-proven mechanical modules used in several models. All employ d.c. servomotors driven by ultra-low noise linear servo amplifiers. This system drive architecture, devised to minimize noise, which might affect the ultrasonic signals, offers considerable advantage, over stepper or switched servo drives.

SDI-Ultrasonic System Features

- 12 Axis coordinated motion
- Rapid curve teaching
- Ultrasonic functional axes
- Variable water path without reteaching
- Scripted scan plans producing multiple files
- Multiple part scanning (arrays) with a single scan plan.
- Shear offset for profiles taught with normal incidence
- Programmable step and continuous jog.
- On-the-fly instrument control built into scan plans.
- 8 Channel Acquisition (Expandable)
- Ultra-Fast Pan/Zoom
- On Screen Distance and Amplitude Measurement
- 3-D Image Display
- Multi-Channel Data Merging
- Instrument Output Calibration
- Image Enhancement
  - Smooth, Filter
  - Contrast, Shift and Subtract
  - Image Flip and Rotation,
  - Rectilinear/ Polar/ Cone Acquisition and Display
  - Data De-skeu—Rectilinear and Rotator (dia inaccuracy)
- Advanced Palette Manipulation
  - Palette Macros
  - Save and Load Custom User-Created Palettes
  - Palette Levels: 4,8,16,32,64,5,10,20,100,256
  - Adjustable and Scrollable Linear % Scale dB Scale +/- 3 dB, +/- 1 dB, +/- 0.5 dB
  - Bipolar Data Palette
- Annotation—up to 100 annotations
- Annotation Markers and Text Printable on Data
- Operator Defined Comments Templates
- 1:1, 2:1, 4:1, 1:2, 1:4, 1:8 Scale Printing
- Data Histograms
- Signal to Noise Ratio Measurement
- Cluster Analysis
- Measurement Cursor, Sizeable, Ellipse or Rectangular
- Save Data as Bitmap or TIFF
- Scan Header Information Display
- Return to Defect Position
- Stop on Defect
- Pause-Continue——Re-scan and Data Overwrite
- Thickness data calibration and acquisition

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