

Above: The Yxlon TireAxis software automates the Y.MTIS modular inspection system (above right)

A technology claimed to have the edge over its competitors for its size, speed, and energy efficiency is the X-Raptor PCR tire testing machine from Alfamation. The compact design features a cycle time down to 15 seconds, low power consumption, and a 'plug-and-play' concept.

A complementary software package – X-Raptor-ADR – has been developed to produce test results that can be understood easily by users, or the system can be configured for full automation. The package can be installed on any Alfamation x-ray testing machine for car and for truck tires, and its processing time of a few seconds means it is compatible with x-ray machine cycle times. The system can detect faults including belt alignment, belt centering, belt width, cord angle, cord spacing, and foreign bodies, and functions such as automated spatial calibration and automated tire centerline calculation can be specified.

Ease of use has also been a focus at LMI Technologies, which claims that no specialist expertise is required to operate its 3D laser sensor systems, suitable for inspection tasks such as edge positions, 3D cross-sections, thickness measurements, and final finish.

The latest range of 'U'-shaped line-scan cameras from X-Scan Imaging Corporation has been designed for high sensitivity and low noise, so everything from belts to cords can be x-ray inspected.

Dr Hsin-Fu Tseng, X-Scan Imaging's chairman, explains, "The unique design and architecture of the XU8800 'U'-shaped camera represents a major price/performance breakthrough in high-sensitivity, low-noise line-scan technology and radiation imaging by reducing assembly complexity while improving performance and reliability within its compact size."

Future technology?

The Advanced Defect-Characterization Research Group and the Research Institute of Instrumentation Frontier of the National Institute of Advanced Industrial Science and Technology (AIST), in cooperation with Dialight Japan Co Ltd and the Life Technology Research Institute Inc, have developed a portable x-ray source with a cold-cathode electron source using carbon nanostructures so that no preheating is required.

The technology is based on a metal-ceramic tube sealed by metallic and ceramic materials, and a low-power tube and a high-power tube have been developed for it, both with a maximum energy of 100keV. In these tubes, a negative voltage is applied to the electron source using carbon nanostructures, and a positive voltage is applied to the target; electrons emitted from the electron source hit the target and generate x-rays.

The carbon-based cold-cathode electron source emits electrons by field emission, even at room temperature. To avoid the problem of field emission degrading through exposure to a high electric field, as in an x-ray tube, the configuration of the electron source using carbon nanostructures and the fabrication conditions are optimized, and processing techniques have been developed to stabilize electron emission. As a result, long life is achieved. Furthermore, the x-ray tube is combined with a high-voltage power source using dry batteries so that energy is consumed only while x-rays are being generated.

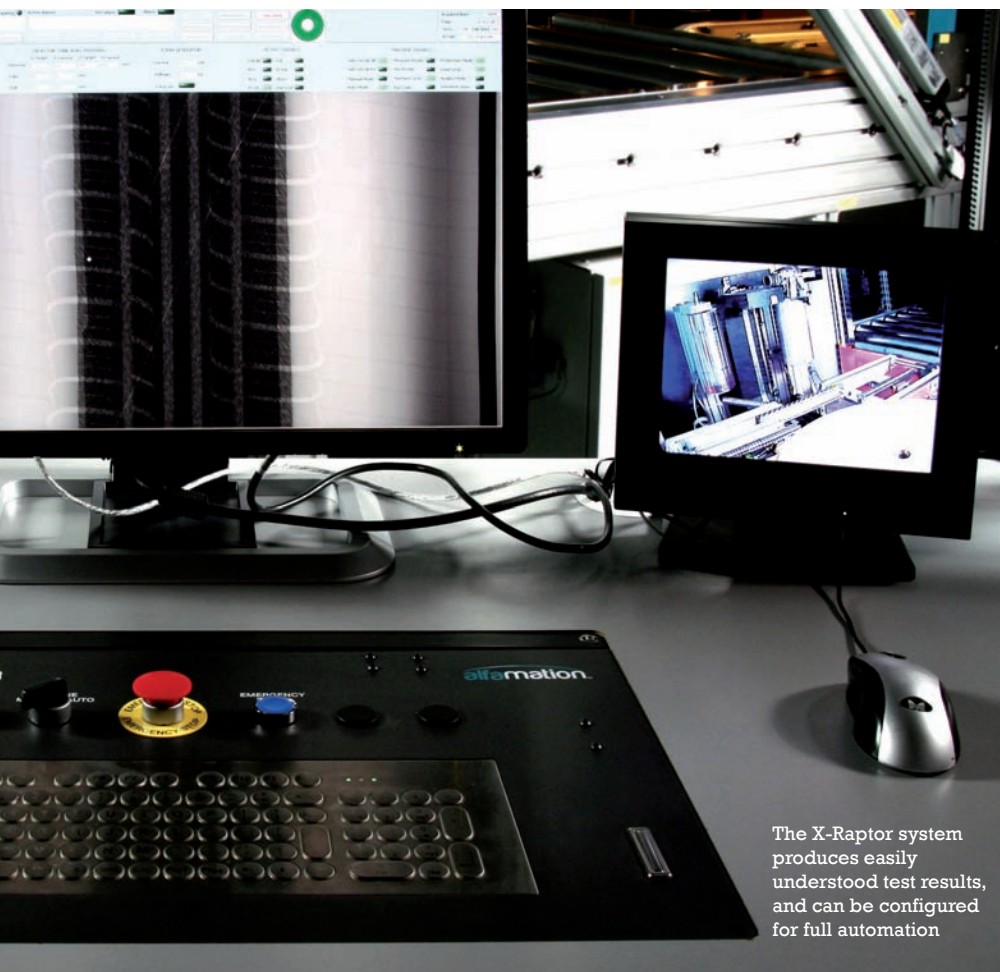
Future developments are scheduled to include higher-energy and higher-output x-ray tubes using carbon nanostructures as the electron source to find applications for non-destructive inspection of larger structures. Studies are also pushing ahead for wider applications such as computed tomography (CT).

The XU8800 series includes five standard models covering a range of active scanning dimensions, detector resolutions, speeds, and sensitivity modes. The range also includes what the company claims is the largest 'U'-shaped line-scan x-ray camera currently installed in the world, with a detector length of 461cm.

Each camera incorporates CMOS silicon imaging detector array chips with on-chip fully integrated signal processing circuits designed for visible wavelength and x-ray sensitive applications. The close proximity of the analog-to-digital converters to the detector chips, and the use of low-voltage-differential-signal (LVDS) technology help to minimize noise and maximize bandwidth. High sensitivity and high-speed readout enable inspection speeds of more than 100cm/sec. The typical dynamic range is 4,000 to 1.

Laser line-based 3D sensors

To simplify the implementation of 3D sensors, LMI has introduced the Gocator range of laser line-based 3D sensors, which do not require complex integration, external controllers, or software development. The various



The X-Raptor system produces easily understood test results, and can be configured for full automation



The CyXscan scanning and metrology system will be launched at Tire Technology Expo 2011



The LMI Gocator features a built-in web server

models are available with different fields of view, clearance distances, measurement ranges, and resolutions to suit different application requirements. "LMI wanted to make the Gocator 2000 series an exciting new breed of sensor with a 'wow' user experience," says CEO Terry Arden.

A key feature of Gocator is the built-in web server, which allows setting up a solution to perform a factory automation measurement and inspection task to be done in minutes. Factory floor technicians can configure the sensor parameters quickly and easily using common web browsers, according to the company.

"Gocator represents an evolutionary leap for LMI, creating a new category of flexible 3D sensors that are powerful and easy to use," adds Arden.

A further development, which will be launched in February 2011 at Tire Technology Expo, is CyXscan, a tire cross-section scanning and metrology system from CyXplus. The system can be used to carry out inspection and real millimetric measurements on cross-sections from motorcycle, passenger, truck, or small OTR tires, sampled every day from production lines. As a specialist in non-destructive testing, CyXplus also provides a full range of x-ray inspection and metrology equipment for passenger, truck, and OTR/earthmover radial tires. For more information, visit the Expo on February 15, 16, and 17 in Cologne, Germany. **tire**

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