

See Inside with CT

Industrial computed tomography is a unique evaluation technique with many applications.

By Steve Wichelecki, Assistant Editor

Industrial computed tomography (CT) provides digital 3-D X-ray models of test subjects, thereby allowing the analysis of interior structures. Industrial CT systems typically comprise four sub-systems: radiation source, manipulator, detector and PC.

Imaging begins with the capture of 2-D X-ray images, or radiographs. The test subject is rotated 360 degrees on a single axis via a motion-controlled stage, or manipulator, while being exposed to X-rays. The X-ray tube produces a conic X-ray beam that penetrates the test subject through one plane and from many different angles, sending a digital signal to a 2-D detector. The detector interprets the signal as a series of digital radiographs, producing a myriad of cross-sectional 2-D X-ray images. The 2-D images are processed in the PC with algorithms that build a 3-D rendering through a process called reconstruction.

The operator can then manipulate the 3-D model, so that the test subject can be viewed from any angle. In addition, the individual 2-D slices that make up the model can be viewed. Because image features do not overlap, CT images are said to be easier to interpret than conventional 2-D radiographic images. Accurate identification of internal feature positioning is another advantage.

In addition, density differences within the test subject can be identified and quantified, and related to desirable or undesirable features of the subject or material. And scan parameters such as cross-sectional slice thickness or data collection time can be varied to achieve the best combination of image resolution and inspection time.

Besides nondestructive testing and inspection, industrial CT has applications in materials research, reverse engineering and metrology. The technology is used to detect cracks and air voids; measure distance, area and volume; and image difficult-to-analyze areas within a test subject.



The efX CT software has fast reconstruction and real-time volume/surface rendering with measurement capabilities. Source: North Star Imaging

What follows are some CT product offerings available today.

North Star Imaging (www.4nsi.com) introduces efX CT software developed for the company's CT X-ray systems. The software includes CT calibration, cone-beam reconstruction, 3-D real-time visualization and analysis tools in the same interface. The software has a five-step, start-to-finish CT interface, automatic calibration capabilities and fast GPU reconstruction speed.

The software's scan mode option, EasyCT, is a five-step process that guides the operator through automatic calibration and the reconstruction process through an interactive interface and automatic processes.

Through the use of the software's automatic calibration capabilities, the

company has the ability to upgrade a DR X-ray system to a 3-D CT system. The DR to CT upgrade not only transforms a DR system to a CT system, it does so without all of the increased time and cost of purchasing a new CT system.

The software's GPU-based reconstruction module includes one to four teraflops computing systems, including 240 to 960 cores for fast CT reconstruction.

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