

# Clarity

Productivity through inspection solutions



## Rhythm Software and XLG3 Increase Productivity and Rigor for GE Energy

GE's Rhythm Visual software allowed GE Energy's Contractual Services team to improve its customer response time from as much as 40 hours to 10 minutes.

### X-ray Demo Center Opens in North America

GE's North America Applications Lab can now apply three solutions—ultrasound, eddy current and X-ray—to customer applications.

### Digitizing a Legend

Belgian piano maker Chris Maene turned to GE's digital radiography to reveal the inside of Steinway's original 1836 piano.

### Phased Array Testing Machine Increases Productivity at Carpenter Technology

A customized GE phased array testing machine cut the time required to inspect Carpenter Technology's steel bars from days to ~30 seconds per bar.

### Testing Machines Re-imagined

Learn about GE's complete portfolio of online and offline testing machine inspection systems for manufacturing processes to deployable systems.

### Product Line Overview

Learn about the broad array of products and services that GE Inspection Technologies offers.



imagination at work

## Rhythm Software Increases Productivity and Rigor for GE Energy



GE Energy's condition based maintenance team with GE Inspection Technologies' XLG3 and Rhythm software.

GE Energy's Contractual Services group operates power plants and maintains plant performance for large frame gas turbines. This involves, among other components, assessing the equipment's condition through borescope inspections.

Recently, the team increased the frequency and thoroughness of borescope inspections in order to enhance their contractual performance for customers. The increased rigor of examinations made it impossible, however, to maintain

rigor around their data collection process. Data was being collected manually through flash images, which were then documented in a written report.

The GE Energy team needed a digital solution and turned to GE Inspection Technologies' Rhythm software.

"Using Rhythm, we increased both our inspection rigor and our customer response time," said Ram Kothapalli, NPI productivity leader for GE Energy's Contractual Services team. "Now we can deliver data to our customers in 10 minutes, whereas it used to take up to 40 hours. This is a huge advantage."

Rhythm enables an increase in inspection productivity and quality. Its advanced data

sharing capabilities allow significant improvements in productivity and enable faster identification of quality problems, leading to reduced production defects and better in-service asset management. Rhythm's archiving system provides one central database for all inspection history to be housed, accessed and analyzed from remote workstations.

"My experience working with GE Inspection Technologies was extremely positive," said Ram. "This was the best coordinated project I have ever worked on and the support and response time from the team was outstanding. Even though we had other options, we did 100% the right thing working with GE Inspection Technologies."



Steve Bosch operates GE's testing machine at Carpenter Technology

## Phased Array Testing Machine Increases Productivity at Carpenter Technology

Carpenter Technology, a manufacturer and distributor of specialty alloys, needed a solution and contacted GE Inspection Technologies.

The company was inspecting its steel bars using conventional ultrasonic technology provided through an outside contractor. The conventional inspection, coupled with transportation time of the steel bars to the contractor, took days to complete.

GE Inspection Technologies provided a solution: a phased array testing machine, installed on-site at Carpenter's Reading, Pa. facility, customized to meet its specific inspection requirements.

Now, Carpenter can test using ultrasound inspection for internal discontinuities in a single pass. The scan, performed through controlled electronics, is complete in

roughly 30 seconds per bar. Conventional ultrasonic methods require up to 10 minutes and multiple passes, depending on the test bar size and shape.

"The technology is fantastic and easy to use," said Steve Bosch, area manager inspection operations. "We're very pleased with the results and the increased productivity we've realized."

Using the customized GE Inspection Technologies design, the stainless steel bars pass through an immersion stuffing box and travel past four test probes. This approach permits the simultaneous and complete testing of all surfaces, on all four sides and the full length of the bar.

Ultrasonic testing by conventional technology depends on a single element

transducer probe to examine the test material. This mechanical probe typically indexes back and forth many times until it completes coverage of the surfaces on all four sides of the test bar. In the process, the sequence must be interrupted to rotate the bar.

*"The GE team was fantastic," said Steve Bosch. "They spent weeks with us to optimize the technology for our needs."*

The system designed for Carpenter allows for infinite testing flexibility depending on the size and configuration of the flat or square to be evaluated. Four-inch wide transducers are used with 128 elements across the face of the probe.

This arrangement permits the technician operator to choose the number of elements and groups in any number of firing sequences that will yield optimum test results. With precisely controlled electronics, the operator can design a virtual probe for each test bar and circumstance. This capability significantly improves flaw detectability.

The new ultrasonic testing station is computer-controlled and integrated by Carpenter into an automated bar processing line behind a hot-water bar wash line designed to remove oil, grease and dirt. For maximum testing efficiency, the water in the test tank is chilled and constantly recirculated.

GE designed the test equipment to minimize operator set-up time, make probe adjustments easily

and maintain test standards without removing fixed equipment. Special devices have been provided to position and hold the flats and squares for testing.

"The GE team was fantastic," said Bosch. "They spent weeks with us to optimize the technology for our needs."

### Rhythm Software

- **Improve Efficiency and Reproducibility.** Advanced image review tools for all X-ray inspection modalities including computed radiography, digital radiography and film digitization.
- **Save Time and Money.** Send information electronically to the inspection experts rather than sending the experts to the information. Share information between workstations, locations and within the supply chain.
- **Automate Specific Inspection Tasks.** Application specific tools improve process efficiency.
- **Protect Your Investment.** Scalable architecture allows the solution to grow with your needs. DICOM/DICONDE compliance ensures your data will not become obsolete.
- **Reduce Training Requirements.** Quickly and easily learn this user-friendly solution.

RHYTHM SOFTWARE fact sheet

### FEATURE

## Digitizing a Legend GE's X-ray technology reveals inside of 1836 Steinway piano



Transport yourself back to 1836. As a citizen of Germany you witness the unveiling of the first Steinway grand piano, nicknamed "the kitchen piano."

Fast-forward to the present day. The only 1836 Steinway kitchen piano still in existence is in the Queens, N.Y. Steinway factory. Chris Maene, a Belgian piano maker who has long been fascinated by Steinway pianos, decided to recreate the original 1836 Steinway.

Bram Crols, a Belgian documentary producer, heard about Chris' ambition, and was taken with his story to recreate the piano. Chris signed on to participate in Bram's documentary and the two started shooting in 2005.

"Chris needed to measure every detail of the piano," explained Bram. "The internal construction is very important to the final sound of the instrument."

To make an exact copy of the 1836 piano and come close to the sound of the original Steinway, Chris needed to see the inside of the piano, which was covered by the sound board. First, he explored the possibilities of an endoscopic camera, but that would not provide sufficient clarity or complete images of the interior.

The next possibility was to X-ray the piano. Initially, this led Chris to the Metropolitan Museum of Art; however, they did not have the proper inspection equipment. Bram then turned to GE Inspection Technologies' Digital X-ray conversion team in his native Berchem, Belgium. There, he found the solution.

Richard Kochakian, GE's Technical Support manager for Computed Radiography (CR) Digital Imaging Systems, and Doug Schuler, GE's Northeast U.S. territory manager, provided Bram and Chris with the CR imaging technology, Rhythm software and IPS imaging plates to conduct the inspection.

"We took multiple exposures to gather images with the goal to measure the interior of the piano," explained Rich. "We initiated the scan, transferred the exposed CR plates into our

system and then recorded each image with its corresponding data, which was immediately archived using Rhythm."

"The high quality images and recorded data through the use of Rhythm proved invaluable to Chris as he rebuilt the piano," said Bram. "He worked as closely as possible to the original model, and all the scientific measurements, like the X-raying, keeps us as close to the original as possible."

*The recreated 1836 Steinway piano debuted at the international Steinway 170 festival at the Concertgebouw in Bruges, Belgium, played by pianist Abdel Rahman El Bacha. Bram Crols' documentary, "Building a Legend," will premiere on May 25, 2007, at the same concert hall and will subsequently be televised across Europe.*

### Features of the CR50P

- Lightweight, compact and portable—weighs only 22 kilograms (48.5 pounds).
- Optimized optics and scan resolution from 50 to 130  $\mu$ m pixel pitch.
- Results can be displayed on a connected laptop or a local high-resolution monitor. Output data may be processed using Rhythm software.
- Accepts flexible, phosphor imaging plates up to 35.5cm (14 inches) wide and of virtually any length.
- Plates can be processed on a continuous basis, with one plate being fed into the unit while another plate is being scanned.
- Can operate in harsh environments. Plates feature a special protective, scratch-resistant layer.

CR50P fact sheet

## X-Ray Demo Application Center Opens in North America

GE Inspection Technologies' North America Applications Lab now offers three solutions: radiography, ultrasound and eddy current. The team in Lewistown can take an application sample and apply all three inspection methods, in one location, to determine the best possible solution.

"Opening the X-ray Demo Center in Lewistown is a significant advantage for our customers," said Jeff Anderson, product management vice president for GE Inspection Technologies.

"Customers can now see all three modality solutions applied to their application and then immediately pulse the onsite GE experts to discuss their solution," said Anderson. "Having X-ray, Ultrasound and eddy current solutions in one lab allows GE to truly assess what is the best testing method to solve our customers' applications."

In 2006, GE invested more than \$350,000 in the North America lab

and will continue to invest and develop its technology and equipment.

"Setting up the X-ray Demo Center in Lewistown is a demonstration of our commitment to bringing film, digital conversion and testing machine/system radiography solutions to North American customers," said Alan Julier, North America regional sales manager.

X-ray technology and equipment in the lab includes a large vault rated for 450kV, which will house a 450kV Titan, a 225kV Titan, a 160kV microfocus tube, a 9-0-inch Tri-field image intensifier with an 8 bit CCD camera and a 9-inch Tri-field image intensifier with a 12 bit CCD camera. Other equipment includes an X-Cube compact with 160kV Titan, a vertical cabinet with 320kV Titan and a number of Rhythm workstations with DXR panels, CR plates and scanners and film digitizers.



## Tradeshaw and Training Schedules

For GE Inspection Technologies tradeshaw and training schedules, visit [www.ge.com/inspectiontechnologies/CLARITY](http://www.ge.com/inspectiontechnologies/CLARITY)

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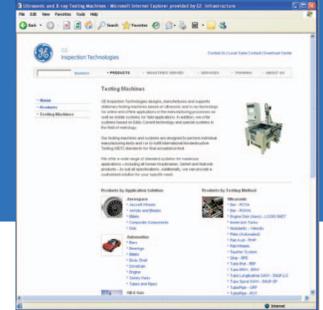
## Testing Machines Re-imagined

Discover the new Testing Machines' Internet website. We offer a complete portfolio of online and offline inspection systems for manufacturing processes as well as field deployable systems. Learn more about the segments we support and the products we manufacture.

[http://www.geinspectiontechnologies.com/en/products/testing\\_machines](http://www.geinspectiontechnologies.com/en/products/testing_machines)

Highlights of the new site include:

- Integration of the Nutronik site
- Addition of more than 20 new products



## Product Line Overview

GE Inspection Technologies designs, manufactures and services radiographic, ultrasonic, remote visual inspection and eddy current equipment, which is used in a wide range of industries, including aerospace, power generation, oil and gas, metals and castings and automotive. Agfa NDT, Hocking, Krautkramer, Seifert, Nutronik and Everest VIT are now one team under one name: GE Inspection Technologies.

### Ultrasonic

- Transducers
- Precision thickness gages
- Corrosion thickness gages
- Flaw detectors
- Portable scanners
- Phased-array flaw detectors
- Testing machines and integrated systems

### Radiography

- X-ray generators
- Film processors
- Film
- Computed radiography
- Digital radiography
- Testing machines and integrated systems

### Software Solutions

- Image acquire, review and archive
- Application specific

### Remote Visual

- Borescopes and fiberscopes
- Videoprobes
- Pan-tilt-zoom cameras
- Inspection services
- Equipment rentals

### Eddy Current

- Probes
- Instruments
- Testing machines and integrated systems

### Metrology and Analytical

- Hardness testers
- Lightscan—blade inspection system
- X-ray diffraction

### Services

- Training
- Product service

Agfa NDT

Hocking

Krautkramer

Seifert

Nutronik

Everest VIT