NORTH STAR IMAGING

NSI

AN ITW COMPANY

X

Industrial X-ray & CT Systems | Inspection Services

Software | Service & Training

Industrial X-ray & CT Technology

What is Digital Radiography?

Digital radiography (DR) is a nondestructive 2D X-ray inspection method using a digital X-ray detector in place of X-ray film. DR allows for real-time X-ray inspection of your part or object - no more waiting for film to process! You can make scan adjustments on the fly and also apply digital image enhancements quickly and easily – saving you time. Real-time product analysis will help you to identify the configuration, integrity and quality of internal components, all without destroying your part.

DR detectors are designed to be used time after time, helping to eliminate the cost of consumables – saving you money.

Our DR systems are designed to make your business and your team as efficient as possible. Programmed and repeatable inspection sequences, easy to use software, and superior image quality, lets you focus on monitoring your product quality while also increasing throughput.

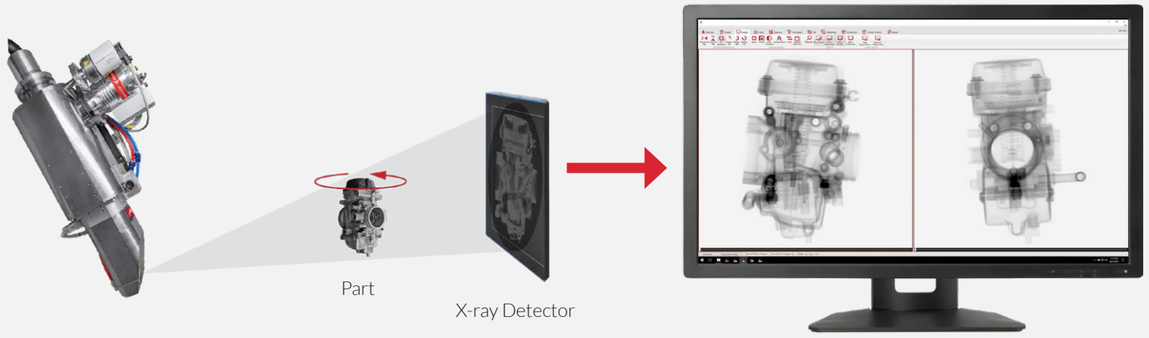
What is Computed Tomography?

Computed tomography (CT) is a nondestructive 3D X-ray inspection method that allows you to view and inspect the internal and external structures of an object in 3D space. CT works by taking hundreds or thousands of 2D digital radiography projections around a 360 degree rotation of an object. Proprietary algorithms are then used to reconstruct the 2D projections into a 3D CT volume, which allows you to view and slice the part at any angle.

CT helps eliminate interpretation errors and introduces capabilities that are not available with any other technology.

Our CT systems are the easiest to use in the industry. efX-CT software uses five simple steps to guide you through the CT scanning process, this allows you to quickly start inspecting your product – increasing your quality and efficiency.

Digital Radiography Process

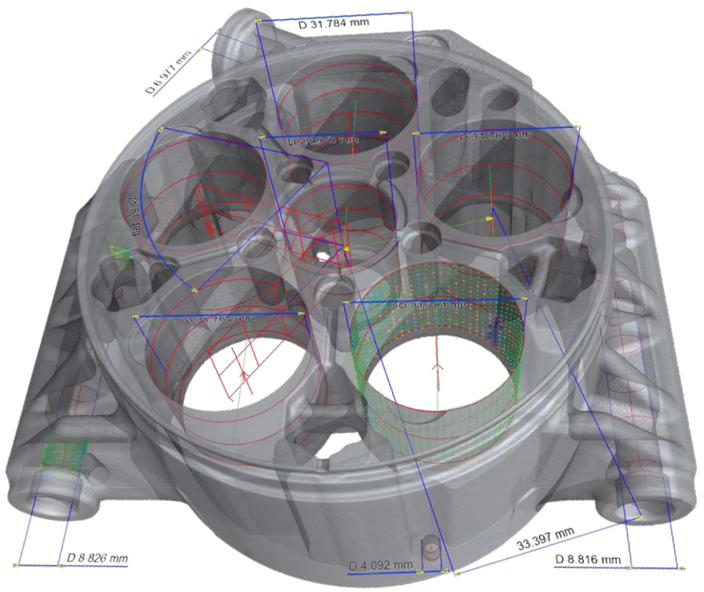


Computed Tomography Process

Inspection Services

North Star Imaging's Inspection Services Group provides real-time X-ray inspection and computed tomography scanning services to anyone needing to verify the integrity of internal components. The "inside view" that our team produces is unparalleled in the industry and is the foundation for all of the services that we provide.

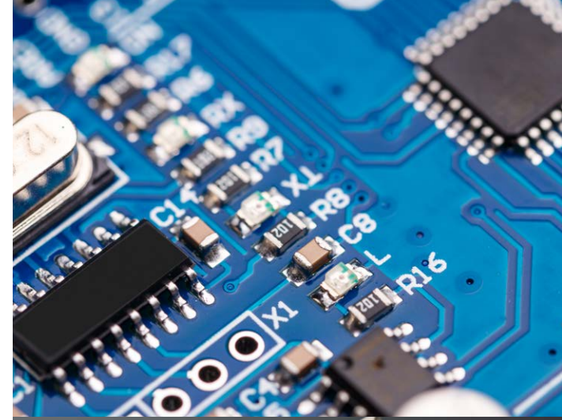
When you need high accuracy examination of internal components or wish to inspect the dimensions of any assembly, call on the Inspection Services Group. No other company offers a broader range of X-ray scanning services or the depth of nondestructive testing expertise.



- Failure analysis
- Assembly verification
- 2D and 3D metrology
- Internal and external measurements
- Research and development (R&D)
- Product quality compliance
- Product contamination
- Weld and braze quality analysis
- High energy (MeV) inspection

- Plastic welding/bonding quality verification
- Additive manufacturing system qualification
- Additive manufacturing process monitoring
- Reverse engineering
- Density analysis
- In situ monitoring
- Advanced material analysis

- Museum artifact digitization
- Aluminum and steel castings inspection
- Medical and pharmaceutical device inspection
- Electronic component inspection
- Additive manufacturing product inspection
- And much more



Systems

North Star Imaging offers a full range of systems to meet your digital radiography, computed tomography, and metrology needs. All of our industrial X-ray & CT systems are modular, giving you the flexibility to select the best combination of features for your specific application.

Our systems are designed with superior resolution and accuracy while maintaining an easy to use interface. Whether it's high speed 3D scanning, failure analysis, or reverse engineering, our systems are built for efficiency and repeatability to ensure your components function safely and correctly each and every time.

Ranging in size from compact to large vault options, you can seamlessly acquire full internal and external details of your components.

X25®

Compact & Efficient

The X25 is suited for small to medium sized objects. It offers the same features as our larger systems while being able to fit through a standard size door.

160 kV
Maximum X-ray Energy

37 in
[94 cm] Maximum Focal Distance

9 x 6 in
[22 x 15 cm] Nominal Part Envelope

X3000

Dynamic & Precise

The X3000 is the best option for customers needing a compact system with capabilities that are typically only available on a larger X-ray or CT system. This system has the versatility needed for inspecting small or large components.

240 kV
Maximum X-ray Energy

53 in
[134.6] Maximum Focal Distance

19.5 x 24 in
[50 x 61 cm] Nominal Part Envelope

Systems

X5000

Versatile & Configurable

The X5000 has a large scanning envelope for larger parts while maintaining the ability to inspect small components. This system also has an ergonomic loading feature to be able to easily load large parts.

450 kV
Maximum X-ray Energy

47 in
[119.4 cm] Maximum Focal Distance

32 x 48 in
[81 x 121 cm] Nominal Part Envelope

X7000

Modular & Robust

The X7000 has the largest scanning envelope and longest focal distance of our standard systems. This system allows you to scan large parts while maintaining the ability to inspect small components.

450 kV
Maximum X-ray Energy

90 in
[228 cm] Maximum Focal Distance

60 x 60 in
[152 x 152 cm] Nominal Part Envelope

Standalone Manipulators

X3500, X5500, & X7500

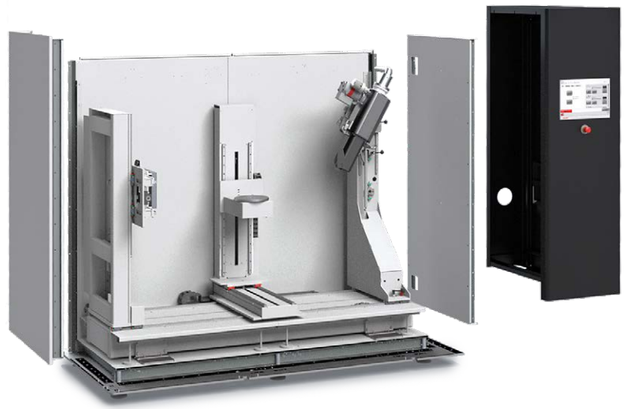
Standalone manipulators offer the flexibility to reuse an existing cabinet or vault. These manipulators offer the same great functionality of our other systems while taking advantage of your existing resources.

Our standalone manipulators feature the same system specifications as our cabinet systems.

Modular Construction

X3000, X5000 & X7000

The modular cabinet design allows the system to be installed in an area where a standard cabinet installation cannot be accommodated. During production, the cabinet is manufactured so that it may be disassembled into sections and reassembled on-site.



MeVX Series

High Energy Systems

Our high energy systems are designed with proprietary methods of scatter reduction that when combined with our specialized techniques and modalities have repeatedly proven to produce the highest image quality in the industry. Offered with energies up to 9 MeV, the MeVX Series of systems provide the same ease of use as our low energy systems in a high energy format. Utilizing our current efX Software Suite, along with the superior service, support, and training that we are known for, puts these systems in a class of their own.

9 MeV
Maximum X-ray Energy

25.8 ft
[7.87 m] Maximum Focal Distance

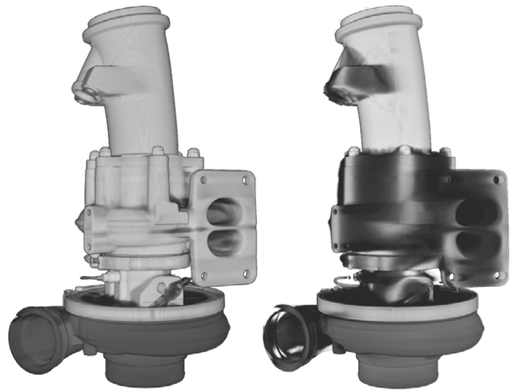
3,000 lb
[1,360 kg] Maximum Capacity

Reduce Artifacts with High Energy

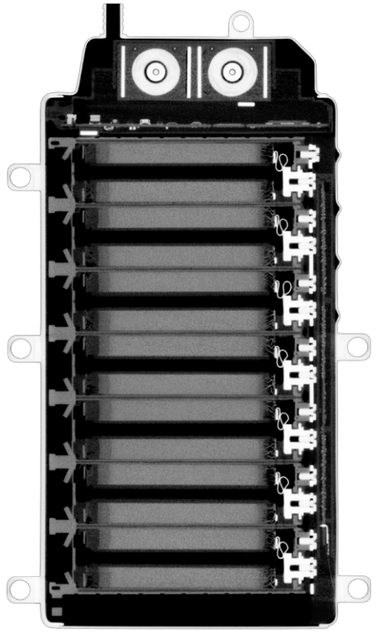
When inspecting large, dense, or thick materials, X-ray penetration can be difficult with energies of 450 kV and less. Noise, scatter, and beam hardening artifacts may also contribute to the image fidelity. Our high energy X-ray systems allow inspection of extremely dense and critical parts to not only improve penetration, but also measurement accuracy, feature clarity, and overall image quality.

Accurately represent your true data with our MeVX Series systems. Remove the questionable interpretation and gain insight into better data.

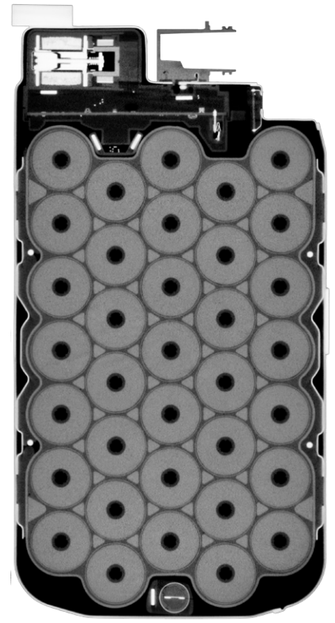
6 MeV **450 kV**



Steel Turbo Pump



9.25 in



Electric Vehicle Battery

Systems

Autonomously Operating Systems

RobotiX technology makes automatic part loading, unloading, and manipulation effortless through a simple programing interface that allows the end-user to easily create new robotic motion programs. RobotiX is offered on all systems, allowing for seamless integration with efX-DR and efX-CT software. This means your operators don't have to learn another software program, which saves your company valuable time and money.

Adding RobotiX to a system reduces cycle time, increases productivity, and allows for more efficient use of the equipment. Our RobotiX solutions, when combined with our Assisted Defect Recognition software, can significantly automate the X-ray inspection process.

Benefits

- Automatic part loading and unloading for autonomous operation
- Automated part manipulation
- Reduced cycle time for increased productivity
- Simple user interface with sub-routines
- Seamless integration with efX-DR and CT

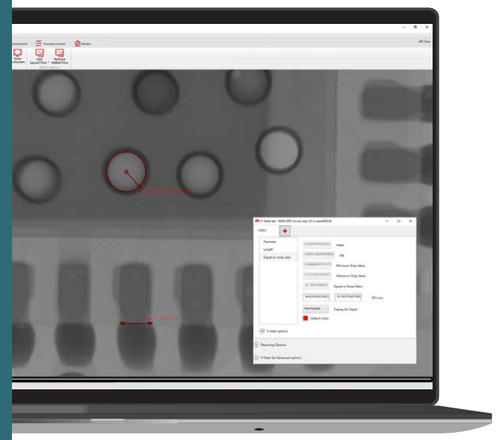
Features

- Available on all systems
- Dual RobotiX source and detector manipulation available on the X7000
- Reach and capacity dependent upon application
- Up to ±0.00079 in (± 0.02 mm) repeatability
- OSHA compliant safety fence

Software

North Star Imaging develops the most advanced industrial digital radiography and computed tomography software for the non-destructive inspection industry. Our efX software suite is exclusively designed & developed at North Star Imaging.

The i4.0 compatible efX suite includes everything you need to be successful with DR & CT with additional modules to expand your capabilities and tailor the software and system to your products, processes, and people.



efXVIEW

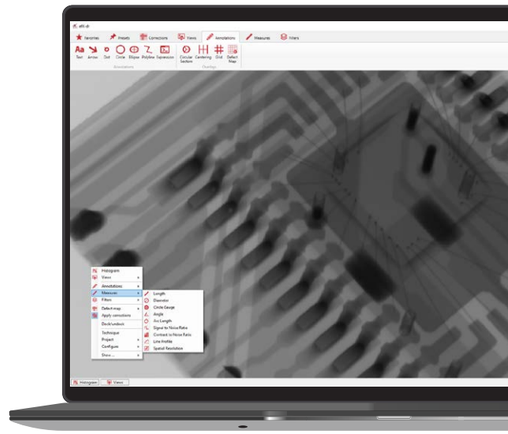
2D Image Viewer

efX-View provides extensive image enhancement functions, measurement, and analysis tools for DR images and CT slices. Seamless integration with all efX software with an easy to navigate user interface.

efXDR

Digital Radiography Acquisition

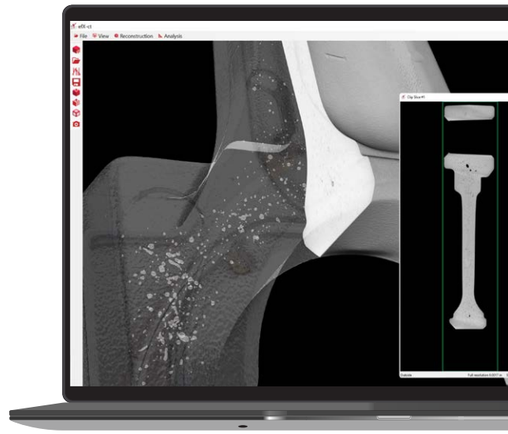
Real-time digital radiography software developed entirely by North Star Imaging that seamlessly integrates with our efX-CT software. Easily acquire continuous, step, fan beam, or VorteX CT scans. Enhance your detector capabilities with MosaiX for larger sized scans, and SubpiX for improved resolution. Our software is fully DICONDE compliant and capable of automatically creating customizable technique sheets.



efXCT

Computed Tomography Reconstruction & Visualization

The easiest, fastest and most complete industrial computed tomography software on the market. 3D X-ray has never been easier with an intuitive interface, a guided wizard for easy CT reconstructions, and automatic parallelization for systems with multiple CPUs and GPUs. efX-CT can handle a broad range of input file formats and output formats are non-proprietary. Our software features a unique geometry definition independent of system/mechanical precision.

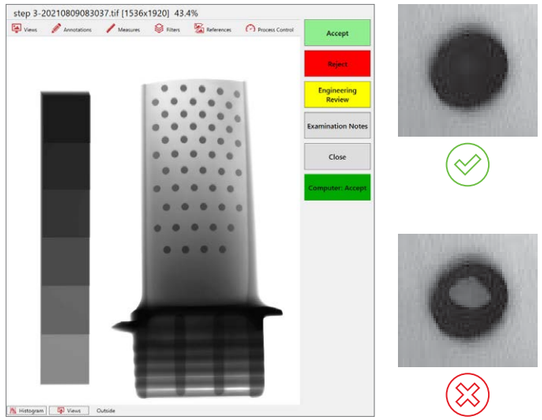


Software

efX ADR

Assisted Defect Recognition

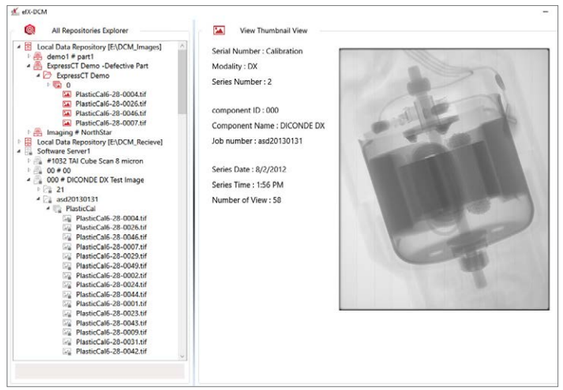
efX-ADR offers a simple and intuitive user interface that easily integrates into production workflows for automatic processing. Our software can help increase throughput, repeatability, and can reduce costs. Users can select from a wide range of defect-detection mechanisms to find what works best for their parts.



efX DCM

DICONDE Management

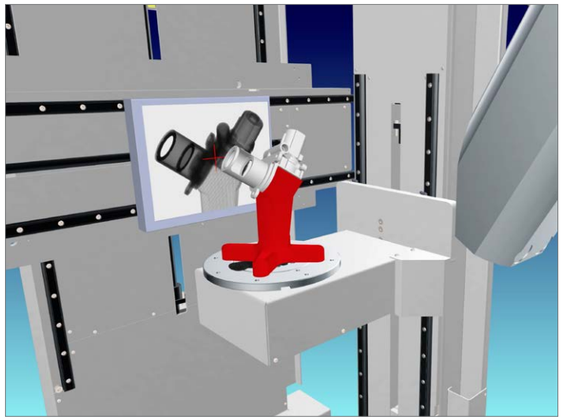
Our efX software suite is fully DICONDE compliant. Produce, view, and store DICONDE compliant files with compatibility between vendors. efX-DCM allows for easy retrieval through searching metadata such as part information, technique information, user information, image status, and more.

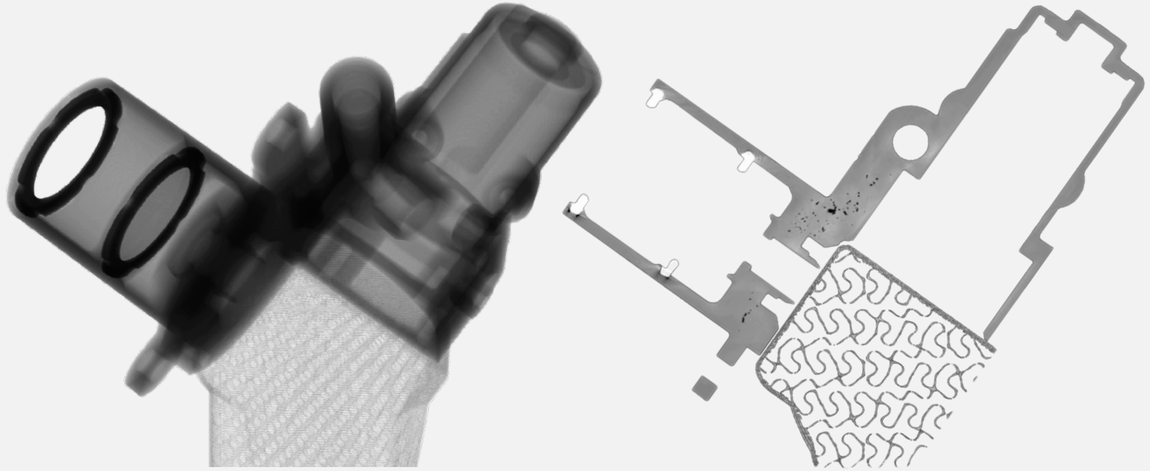


efX SIM

System Simulation & Offline Programming

efX-Sim uses a sophisticated X-ray algorithm that simulates how a polychromatic X-ray beam interacts with parts, alloys, and even multiple materials at once. Any change to the system or parts being simulated will update the final detector image immediately. efX-Sim can be configured as a digital twin to all of our standard systems, this enables technique development without occupying a physical system.





Simulated Radiograph

Simulated CT Slice

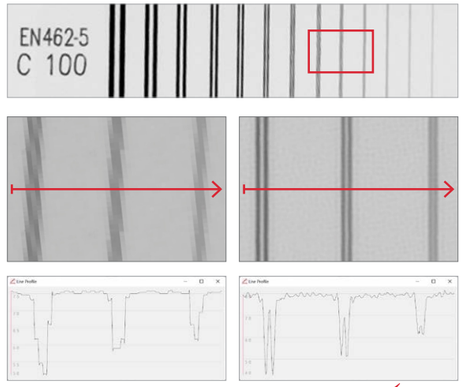
Software Modules

subpiX

Higher Resolution, Same Detector

SubpiX is an imaging technique that generates images with improved resolution that is typically double the detector resolution. SubpiX provides a larger field of view for a given resolution, better signal-to-noise and contrast-to-noise ratios, and faster acquisitions due to a larger focal spot.

Line Pair Gauge



Conventional CT

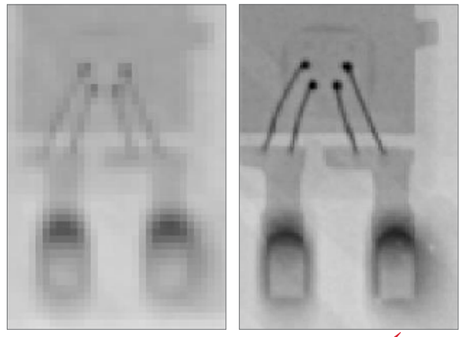
subpiX

mosaiX

Larger Parts, Same Detector

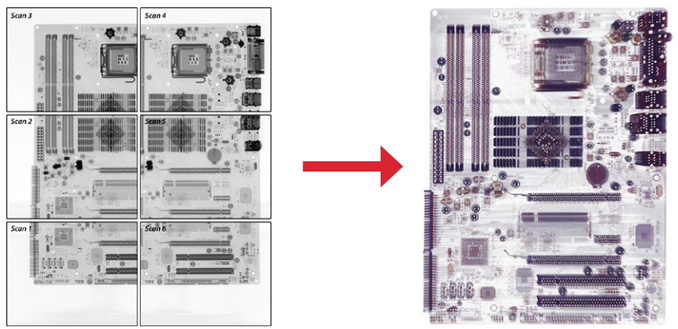
MosaiX is an imaging technique that stitches multiple images to form one seamless image with a much larger field of view. With MosaiX the effective imaging field of view is no longer limited by the detector panel size, and can now be expanded as large as the cabinet will accommodate. MosaiX can also increase the magnification factor well beyond what is possible with standard imaging.

Circuit Board



Conventional CT

mosaiX

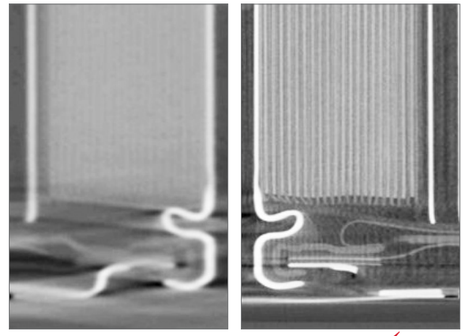


vorteX

Elongated Parts, Single Scan

VorteX is a CT technique that allows for scanning elongated objects that cannot fit into a single exposure, enabling higher magnification and increased resolution. VorteX also reduces cone beam artifacts that can be present on conventional CT scans.

Lithium Battery



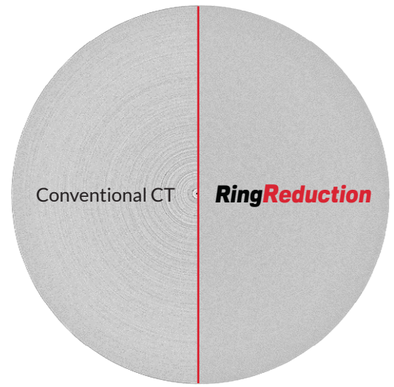
Conventional CT

vorteX

RingReduction

Ring Artifact Reduction

Ring Reduction compensates for the irregular response of the detector pixels during a CT scan. This increases quality by reducing artifacts that can mask indications or be misinterpreted as an indication. Ring Reduction can also improve volume surface quality.



4D CT

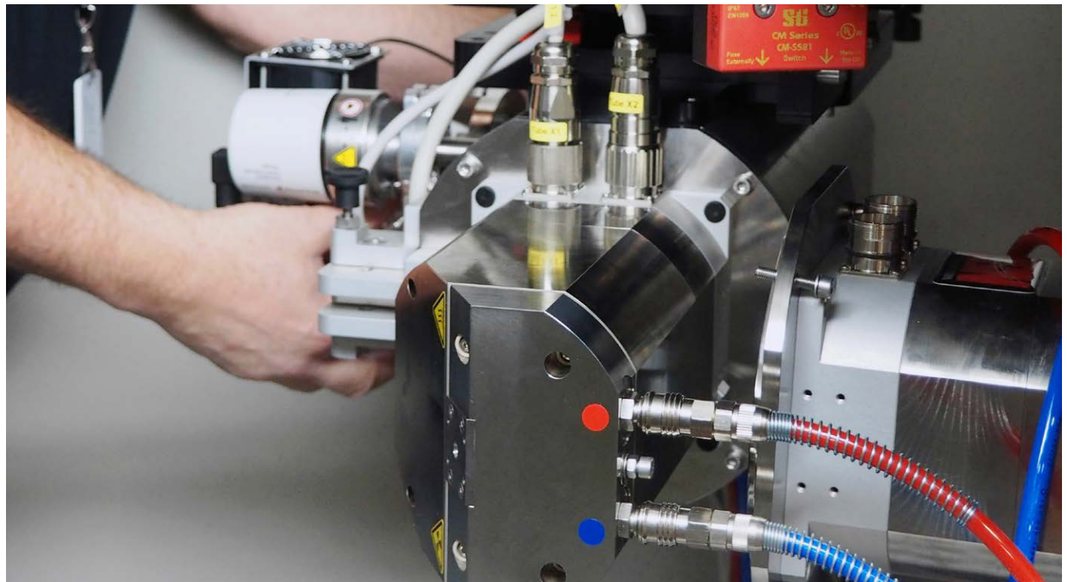
CT With Time & Motion

4D CT allows users to reconstruct a complete 3D CT model that includes time and motion, creating a truly dynamic volumetric dataset. This technology makes it possible to study form, structure, and now – function.

Service & Support

Industrial X-ray equipment requires regular care and maintenance to perform efficiently and remain free from contamination. Regular maintenance, along with regular software updates, maximizes your production output.

Our preventive maintenance packages ensure that your X-ray system operates at its optimum level. Purchasing one of our preventative maintenance agreements will prevent downtime due to unnecessary failures, extend the life of your system, maximize equipment performance, and minimize maintenance costs.



Our factory trained and authorized system specialists are highly qualified to offer a full range of support and services:

- Emergency on-site support
- Software maintenance and support
- Phone and remote access support
- Replacement parts
- Electrical / Mechanical
- X-ray tubes
- Generators
- High voltage cables

Preventative Maintenance Packages

Preventative maintenance will minimize your chances of downtime while saving you money.

CUSTOMER SAVINGS*

NON-CONTRACTS	SILVER	GOLD	PLATINUM
Full Retail Price	30%	40%	50%+

*Based on analysis of average system agreements

Technical Training

X-ray University provides the technical training you need for industrial digital radiography and computed tomography. New operator training packages give you the flexibility to select when, where, and how you learn to operate your North Star Imaging X-ray system. This training will cover everything you need to know to get started on your new system.

X-ray University classroom courses allow you to learn in-person or through our self-paced online training platform. Our classroom courses provide the required education to achieve Level 1, 2, or 3 certifications in accordance with The American Society for Nondestructive Testing, Inc. (ASNT) Recommended Practice No. SNT-TC-1A.

X-ray University also offers advanced coursework and hands-on learning at your site. This is a great way for you to learn the application of our technologies for your specific needs and requirements.

New Operator Training

- System safety features and operation
- Proper system startup and shutdown
- Equipment walk around / explanation of components and location
- Software suite review covering efX-DR, efX-View, efX-CT and production module
- System motion control and programming
- DR acquisition review; covering tube, rotational stage, and detector attributes
- Basic imaging of components and attributes
- CT acquisition and reconstruction attributes
- And more

Classroom Courses

- Interactive classroom settings help promote the exchange of ideas between the instructor and participants.
- Practical hands-on training helps verify that the participant thoroughly understands the theory, principles, and application.
- Adherence to a structured and ASNT-validated class schedule ensures that training takes place in a short, set time frame while meeting ASNT requirements.
- DR / CT Level 1 and DR level 2
- General radiography and CT theory
- General and specific technique development process
- Basic and advanced use of North Star Imaging hardware and software
- System performance optimization
- Data analysis and Trouble shooting

X-RAY UNIVERSITY

ISO 9001:2015

ISO 14001:2015

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