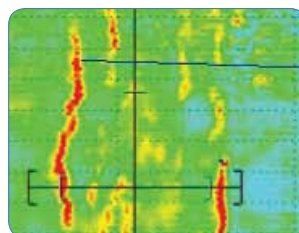
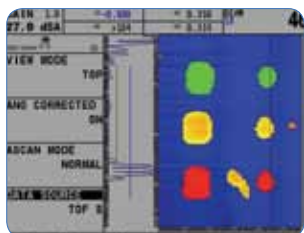
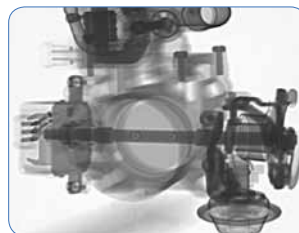
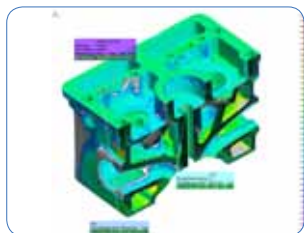
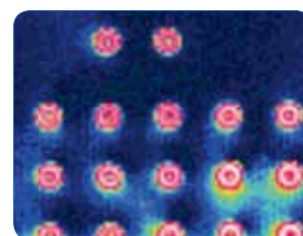
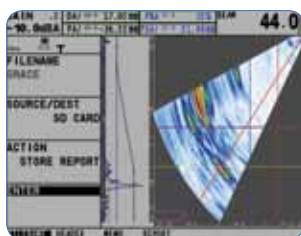


Inspection Technologies



Many modalities. More confidence. Better decisions.



Many modalities. More confidence. Better decisions.

GE's Inspection Technologies business (part of GE Measurement & Control) partners with you to meet your non-destructive testing needs. We provide a full suite of non-destructive testing (NDT) solutions, including radiography, computed tomography, remote visual inspection, ultrasound, Electromagnetic, hardness testing and metrology. Combined with our Rhythm® software platform, GE is your ultimate provider of productivity solutions, supplying accurate and reliable inspection data that can be shared seamlessly with your colleagues and customers around the world.

Rapid advancements in digitization, software development, and imaging capabilities continue to provide improvements within the fields of non-destructive testing and inspection. Often derived from the medical community, both 2D and 3D imaging can solve or trend complex issues in the areas of component life extension, fitness for service, design optimization, quality control or root-cause failure analysis. High-resolution imaging has become practical, cost-effective and can save critical time when properly applied to real-world applications.

GE's Inspection Technologies is a world leader in providing advanced non-destructive imaging using the electromagnetic, gamma- and X-ray, ultrasonic and visible energy spectrum. We have enormous depth and breadth of know-how that can be applied to your needs.

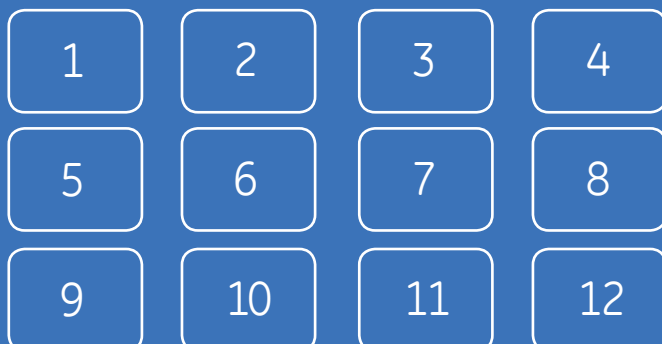
Our applications cover a wide range of industries:

- aerospace
- metals & castings
- oil & gas
- power generation
- transportation

Read on to learn more about GE's solutions in these industries and how we can help meet your most challenging inspection needs.

www.geinspectiontechnologies.com

On our cover



1. Remote visual image of auger dryer system
2. Phased array weld image
3. 3D pore analysis in a cast aluminum part
4. Electromagnetic image of aircraft fuselage
5. 3D pore analysis, metrology and reverse engineering in an aluminum casting
6. 2D X-ray image of steering column
7. X-ray image of engine carburetor
8. Remote visual image of damaged turbine blade
9. Phased array TopView image of flaws in a pipe
10. Remote visual image of wind turbine gearbox
11. Electromagnetic array image of stress corrosion cracking on pipe
12. NanoCT® image of CSP solder joints



Advanced non-destructive imaging

GE's Inspection Technologies is dedicated to providing high-quality products and services for the oil & gas, power, aerospace and transportation industries. Our inspection solutions, including advanced imaging capabilities and powerful software tools, offer high-quality, data-rich images so customers can make faster and better informed decisions to protect asset health, help ensure safety, quality and boost productivity.

High-quality inspection results

Used in hundreds of applications across the oil & gas industry, our non-destructive testing products deliver high quality inspection results. Whether you're inspecting boilers, condensers, gas turbines or pipelines, our products can help protect your assets against corrosion, leakage and extend the life of your plant. Even in the harshest environments, our leading-edge inspection solutions boost productivity and improve safety for our customers, based on our ability to understand your needs and commercialize advanced inspection technologies.

Improving efficiency

The power industry is continually challenged to improve efficiency, runtime and output. We help you meet those challenges by providing solutions for key power generation applications in fossil, nuclear and renewable energy markets. Applications range from Balance of Plant (BOP) components, steam generators, turbine and electrical generators to pipes and vessels and reactor internals. Our reliable, advanced technology-based inspection solutions and support services enable power generation customers to maximize efficiency, minimize downtime, enhance productivity and help ensure safety with unyielding integrity.

Meeting or exceeding needs

In keeping pace with new composite materials and changing maintenance requirements of the aerospace industry, we are developing products and new techniques that enable more reliable and efficient inspections. Whether your business is aircraft engine parts production, composite airframe manufacturing or full aircraft maintenance, we have the knowledge and experience to help prolong asset life without sacrificing productivity.

Adding value

We offer a wide range of inspection solutions in every step of the value chain from semi-finished products (rods, bars, billets) up to the final assembling of vehicles and trains. We provide the transportation industry with world-class inspection solutions that help build vehicles more efficiently, reducing scrap and process costs.

Better tools for enhanced decision making

Our Rhythm[®] data management software is a unique software platform that sets our inspection solutions apart from the rest. Once data is captured, it can be analyzed and reviewed, assisting in better and faster decisions in the field and in the office. Rhythm generates reports automatically and stores data with notations for future historical comparison. Rhythm enables secure, quick and easy storage and retrieval of inspection images and data. This user-friendly software stores data in one central location that can be accessed securely by remote users when necessary. Rhythm is used in many inspection applications across all our key segments.

In this brochure

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Product Lines

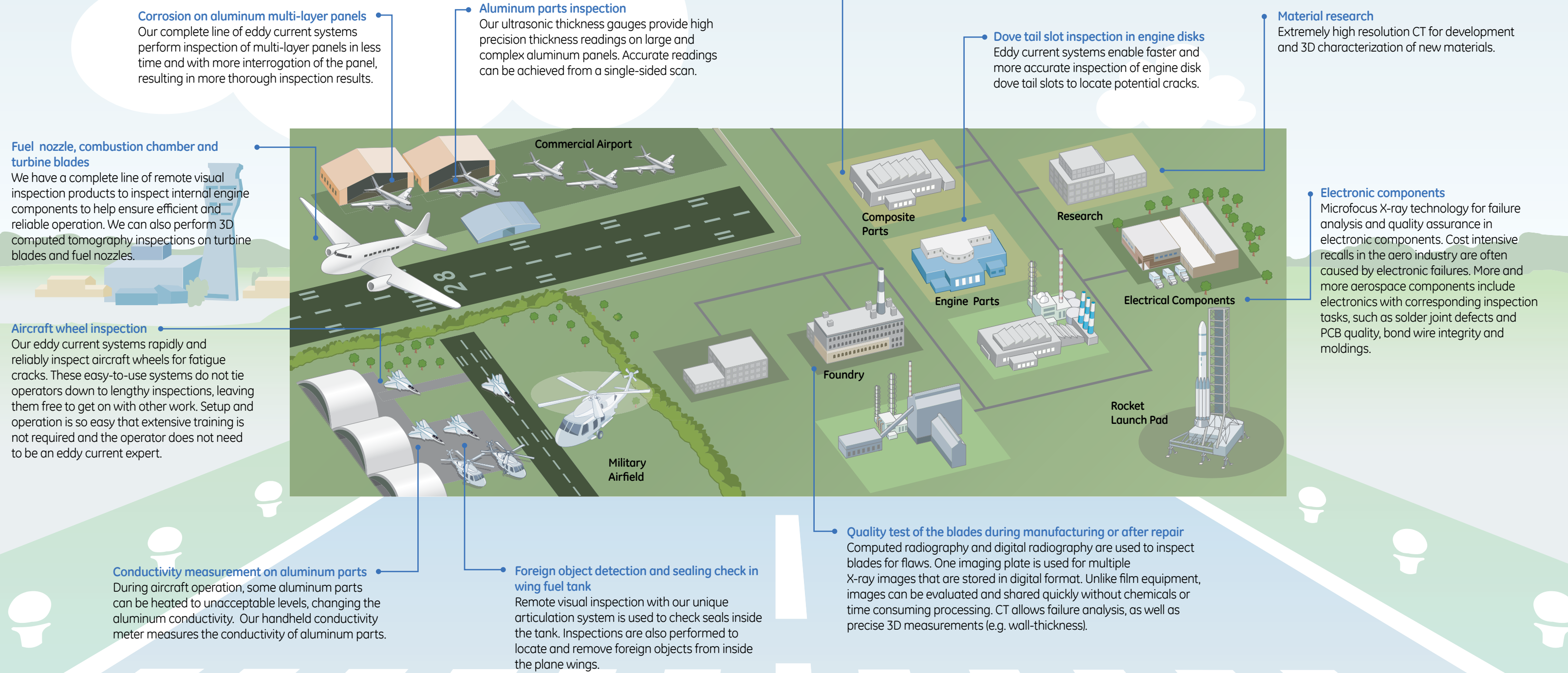
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Regional Offices	<i>back cover</i>
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Aerospace

Whether your business is aircraft engine part production, composite airframe manufacturing or full aircraft maintenance, the GE's Inspection Technologies aerospace team will support your process with nondestructive testing and inspection solutions that match worldwide OEM specifications and help you reach your productivity goals.

Menu directed inspection™ (MDI) and archiving X-ray digital images
MDI for engines improves reporting and data sharing. Our DICOM compliant Rhythm software enables manufacturers to easily share and archive radiography images with remote experts, OEMs and supplier locations. Similarly, ultrasonic and eddy current images from airframe inspection can be easily archived in one central location with secure remote access from the field or the office. Rhythm software offers one platform for all your nondestructive data.



Corrosion on aluminum multi-layer panels
Our complete line of eddy current systems perform inspection of multi-layer panels in less time and with more interrogation of the panel, resulting in more thorough inspection results.

Aluminum parts inspection
Our ultrasonic thickness gauges provide high precision thickness readings on large and complex aluminum panels. Accurate readings can be achieved from a single-sided scan.

Thick aluminum or titanium part testing
Aluminum parts are tested for fatigue cracks using multi-element ultrasonic beams that perform inspections in less time, with better penetration, delivering high quality scan results. We also have automatic composite inspection systems for defect detection in fuselage and blades.

Material research
Extremely high resolution CT for development and 3D characterization of new materials.

Dove tail slot inspection in engine disks
Eddy current systems enable faster and more accurate inspection of engine disk dove tail slots to locate potential cracks.

Electronic components
Microfocus X-ray technology for failure analysis and quality assurance in electronic components. Cost intensive recalls in the aero industry are often caused by electronic failures. More and more aerospace components include electronics with corresponding inspection tasks, such as solder joint defects and PCB quality, bond wire integrity and moldings.

Fuel nozzle, combustion chamber and turbine blades
We have a complete line of remote visual inspection products to inspect internal engine components to help ensure efficient and reliable operation. We can also perform 3D computed tomography inspections on turbine blades and fuel nozzles.

Aircraft wheel inspection
Our eddy current systems rapidly and reliably inspect aircraft wheels for fatigue cracks. These easy-to-use systems do not tie operators down to lengthy inspections, leaving them free to get on with other work. Setup and operation is so easy that extensive training is not required and the operator does not need to be an eddy current expert.

Conductivity measurement on aluminum parts
During aircraft operation, some aluminum parts can be heated to unacceptable levels, changing the aluminum conductivity. Our handheld conductivity meter measures the conductivity of aluminum parts.

Foreign object detection and sealing check in wing fuel tank
Remote visual inspection with our unique articulation system is used to check seals inside the tank. Inspections are also performed to locate and remove foreign objects from inside the plane wings.

Quality test of the blades during manufacturing or after repair
Computed radiography and digital radiography are used to inspect blades for flaws. One imaging plate is used for multiple X-ray images that are stored in digital format. Unlike film equipment, images can be evaluated and shared quickly without chemicals or time consuming processing. CT allows failure analysis, as well as precise 3D measurements (e.g. wall-thickness).

Metals & Transportation

We provide the transportation industry with world-class inspection solutions that boost productivity and quality based on our ability to understand industry dynamics and apply advanced technologies. Our solutions are used in every step from semi-finished products (rods, bars, billets) up to final assembly. The product range includes dedicated manual or automatic in-line solutions based on all major nondestructive testing and inspection methods.

Research and development

Our computed tomography delivers precise information about the shape and geometry of an object on both the surface and internally. This technology reduces development time during R & D and combines measurement and inspection solutions within production.

Rotational tube tester for bar and pipe

Our ultrasonic inspection systems inspect bar and hot processed pipe, including detection of inner and outer flaws, as well as full dimension measurement.

Aluminum cast wheels

Aluminum wheels need to be inspected since they are classified as safety parts. These parts are inspected using fully automatic in-line with X-ray inspection cabinets. Our turn-key solution is designed for high throughput and automatic part identification.

Aluminum cast drive train and engine parts

Due to weight reduction, aluminum cast parts are widely used in the transportation segment. Depending on the production process, porosity and inclusions can cause safety critical and expensive part failures. Failures can be detected using in-line and fully automatic X-ray inspection systems to provide process feedback.

Menu directed inspection (MDI), storing and managing images

We offer MDI for rail and in-service inspection and Rhythm with digital X-ray for blade manufacturing and casting houses. Rhythm software stores and manages inspection results for auditing and historical tracking capability.

Metrology of complex objects

3D metrology with precision CT is the only technique that can measure the interior of a complex object nondestructively.

Rotating water path to inspect bar and tube

The use of phased array probes enables a compact test system without rotating parts. Our test system is adjusted to different diameters by stored parameter sets, enabling a short changeover time.

Quality test of the blades during manufacturing

Computed radiography and digital radiography are used to inspect blades for flaws. One imaging plate is used for multiple X-ray images that are stored in digital format. Unlike film equipment, images can be evaluated and shared quickly without chemicals and time consuming processing. CT allows failure analysis as well as precise 3D measurements (e.g. wall-thickness).

Quality control and service support

Corrosion checks or rain checks are only two examples for the extensive use of video borescopes. The extremely small diameters and the specific extensions, such as extra working channels, make it easy to use video borescopes in cases where you need to look into an object without disassembly. There is a large range of applications for borescopes in production, quality checks, maintenance, engineering and service shops.

Weld inspection (Laser or MIG/MAG welds)

Ultrasonic inspection of welded assembly parts increases safety and meets quality management requirements.

Spot weld inspection

Ultrasonic inspection of spot welded parts replaces destructive test methods, especially for inspection of high strength steel.

Steel and plate

We design and build large-scale automated ultrasonic testing and inspection systems for heavy plate testing for online and offline applications. These systems consist of the complete test mechanism and test electronics, extended by automated evaluation software and web/modem-based remote servicing.

Rail

Our testing machines are designed to detect imperfections and flaws in rail welds. Using ultrasonics, flaws perpendicular to the rail surface, such as lack of fusion and porosity across the entire height of the weld, can be easily detected.

Rail wheel new and re-profiled

An ultrasonic phased array railroad wheel inspection system is a cost effective solution for the inspection of new and re-profiled rail wheels. This system eliminates costly mechanical wheel handling equipment and assures complete coverage.

Wheel and axle

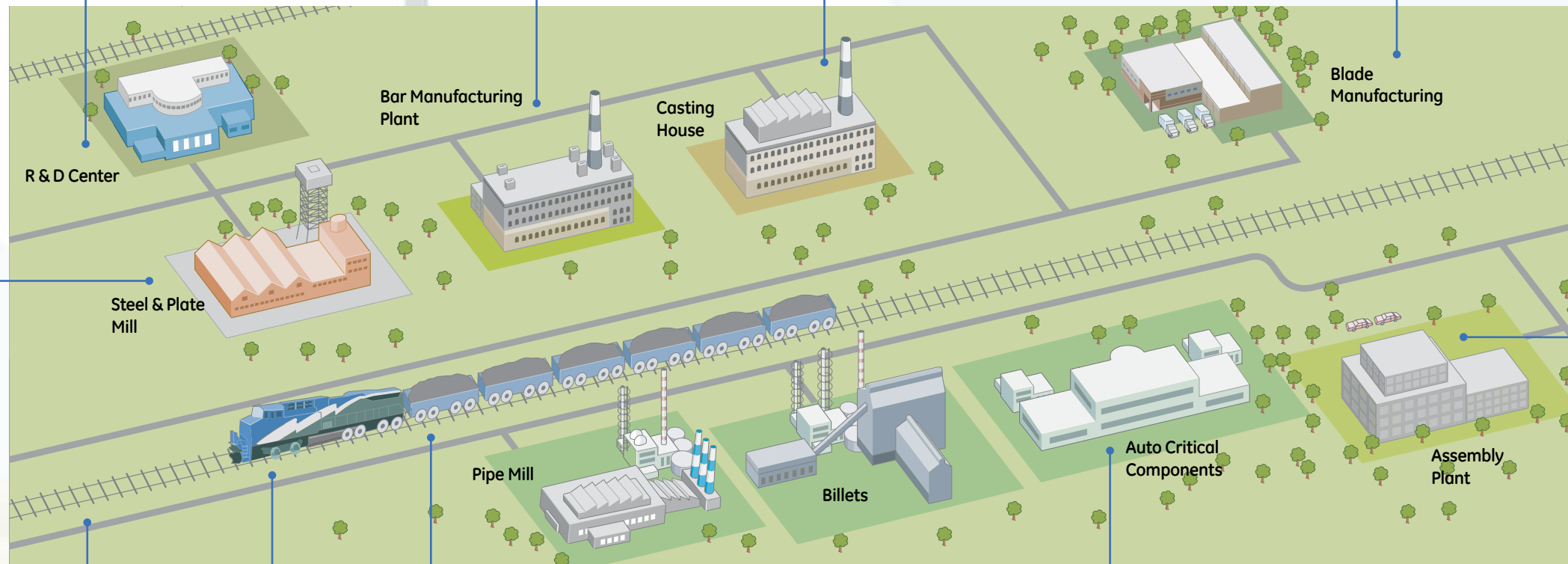
Ultrasonic and multi-channel phased array testing systems are used to inspect wheel set axles for cracks in passenger and cargo carrying cars.

Residual stress in critical engine parts

Our analytical X-ray systems perform residual stress analysis to help provide a high level of quality on supplied products and final products. The fields of application X-ray residual stress analysis include series production monitoring, development and optimization of components, as well as damage analysis for supplier evaluation.

Electronic components

Microfocus X-ray technology for failure analysis and quality assurance in electronic car components. Cost-intensive recalls in the auto industry are often caused by electronic failures. More and more automotive components include electronics with corresponding inspection tasks, such as solder joint defects and PCB quality, bond wire integrity and moldings.

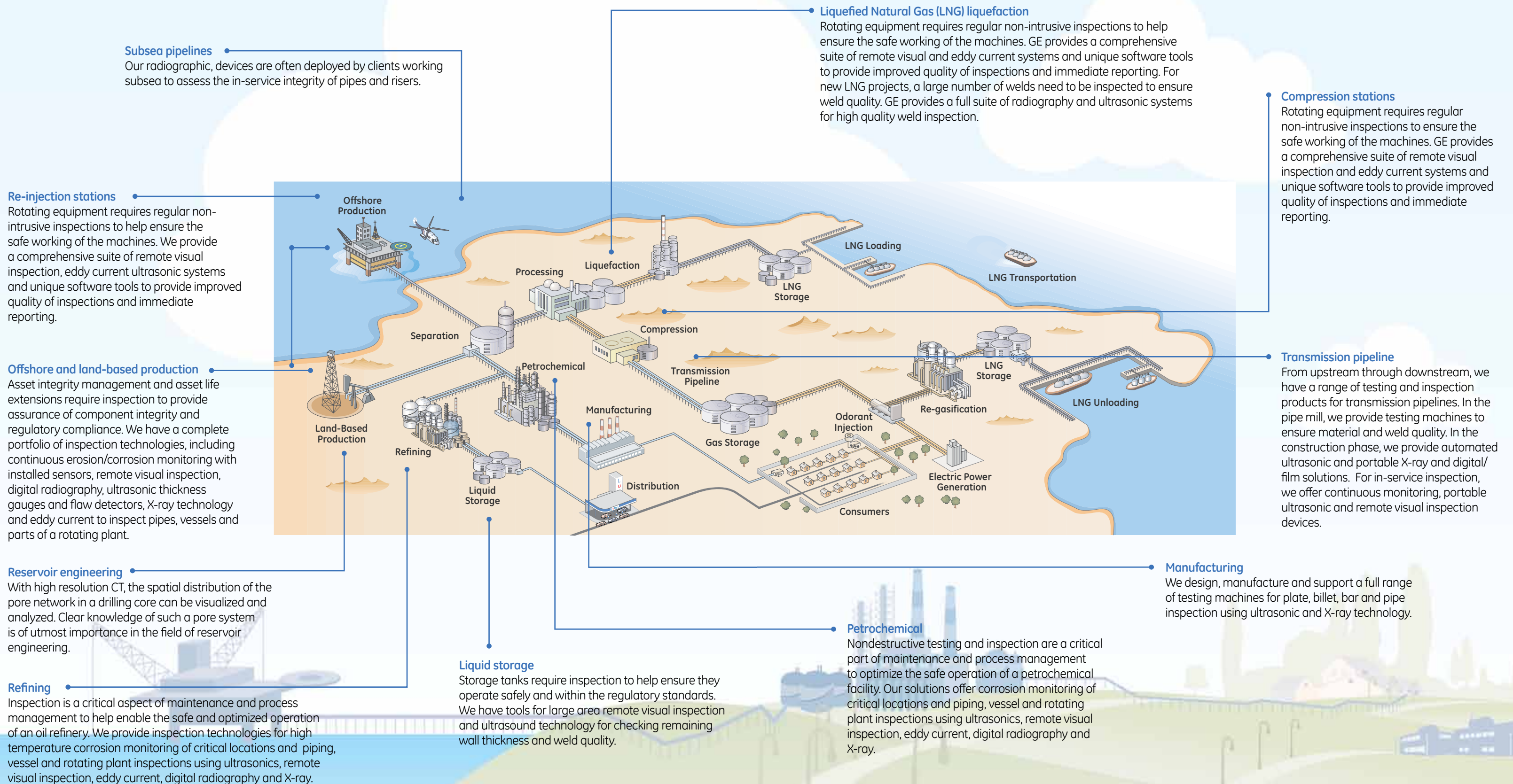


Oil & Gas

GE's Inspection Technologies addresses all major inspection needs for our oil and gas customers. We strive to deliver high-quality products that detect corrosion and inspect welds in a variety of situations and conditions while helping improve productivity. Our leading edge inspection solutions boost productivity, help you improve safety and solve your toughest oil and gas inspection challenges.

Image Management Software - Rhythm

Used widely in the oil and gas industry, Rhythm is a multi-modal inspection software platform incorporating digital radiography, phased array ultrasound, remote visual inspection and eddy current. Rhythm encompasses the image management tools required to help provide asset assurance through proprietary tools such as the wall thickness measurement tool for digital radiography, menu directed inspections for remote visual and a complete archive and web access suite for long-term data management and retrieval. Rhythm is 100% DICONDE compliant, the industry standard for inspection data protocols.



Power Generation

We provide nondestructive inspection products and solutions for key power generation applications, including those for fossil, nuclear, renewable energy markets, transmission and distribution. Our reliable, advanced technology inspection solutions and support services enable power generation customers to help maximize efficiency, minimize downtime and enhance productivity with unyielding integrity.

Image and data sharing

Rhythm software ties all inspected components of the plant into one data file and helps plant operators plan maintenance rather than react to forced outages. DICONDE compliant, this software platform is compatible with our digital radiography, phased array ultrasound, remote visual inspection and eddy current technologies. Rhythm encompasses the image management tools that help ensure thorough inspection results and rapid data sharing.

Primary and secondary piping

To prevent leakage and failures, piping is regularly inspected for corrosion, weld defects and gas accumulation using ultrasonics, remote visual inspection and direct radiography systems. These same technologies are also used to inspect pipes, welds and vessel components to help ensure integrity.

Turbines and generators

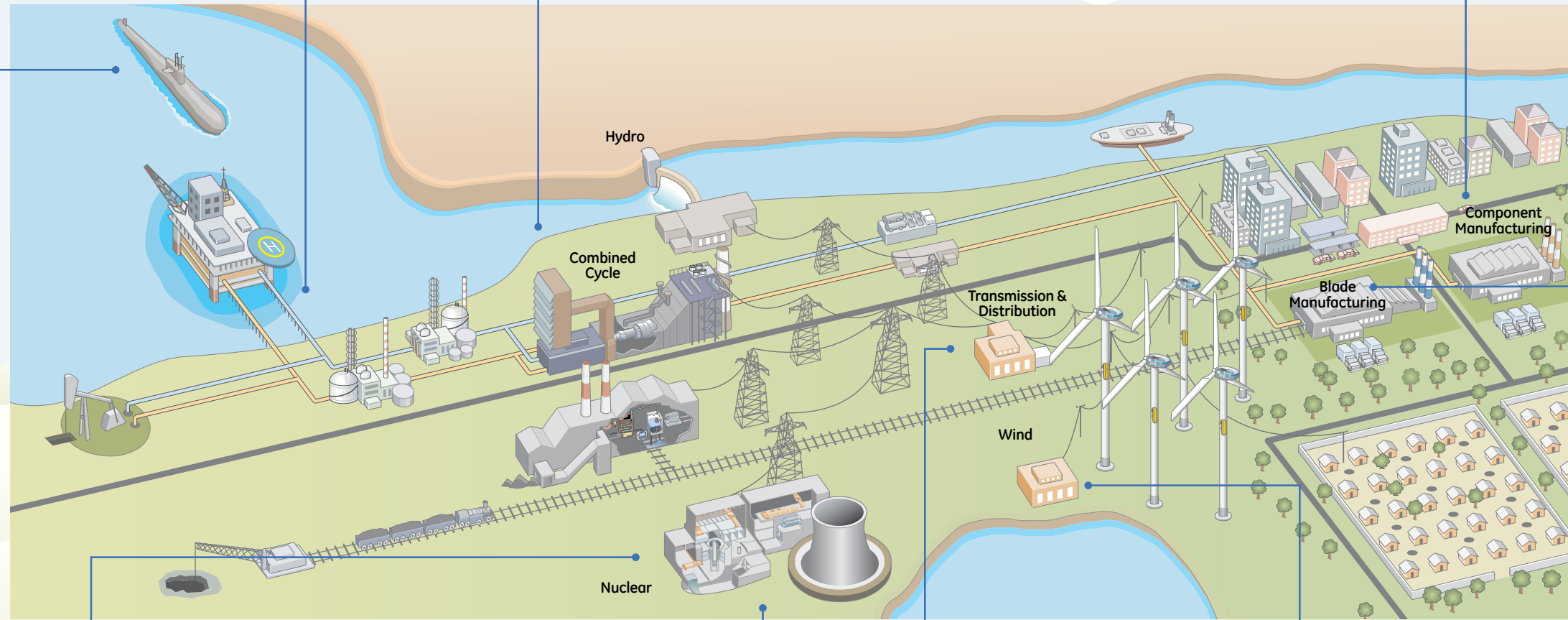
Using our remote visual inspection, eddy current and ultrasonic systems, blades and dovetails found in rotating machines, such as turbines and generators, are inspected for cracks and defects to minimize downtime and possible injury.

Manufacturing power plant components

The very low tolerance for manufacturing defects or foreign matter inclusions in large forgings, such as turbine shafts or in controlling piping and vessel materials, is mitigated by using nondestructive testing systems in the manufacturing facility. Our radiography, film or digital solutions, coupled with ultrasonics, detects volumetric defects. Our eddy current systems are used for near surface defect detection.

Nuclear submarines

To help ensure maximum safety of a submarine crew, numerous nondestructive tests are carried out to verify quality of the vessel girth welds, steam generator system, primary and secondary piping and reactor vessels. The submarine environment demands use of all nondestructive technologies to help ensure safety.



Blade manufacturing for wind energy

Throughout the steps of the blade manufacturing process, ultrasonic technology is used to test composite material for delaminations and defective layering to ensure quality. The bonding of portions of the blade to one another and support structures is also monitored using ultrasonics.

Feed water heaters, condensers and heat exchangers

Proper operation of these crucial components is essential for efficient operation of a power plant. Each machine is inspected internally and externally for fitness for service. Our menu-directed remote visual inspection and eddy current systems can detect defects and cracks that cause leaks.

Reactor vessel

High-pressure boilers and vessels are kept operating safely using remote visual inspection. Regular inspection for cracks and defects help ensure safe operation and help prevent loss of structural integrity of the vessel.

Transmission and distribution

Remote visual inspection of switches helps ensure compliant and safe operation of the substation. Digital Radiography allows for condition-based maintenance of gas-insulated switches.

Wind generation

Condition-based inspection of the gearbox in the nacelle decreases the likelihood of catastrophic failure and enables scheduling of repairs and preventative maintenance. Our easy-to-use remote visual inspection systems require no special training, while producing more uniform inspection results.

Nuclear fuel and fuel rods

Ultrasonics, eddy current and radiography are commonly used in the manufacturing environment to test rods for ovality to ensure the rods fit into a fuel cluster. A fuel assembly that does not fit precisely as designed can cause long and unacceptable delays in a plant maintenance outage.

Government Infrastructure & Public Safety

At the federal, state and local or municipal levels, we provide governments with technology and tools to help maintain vast infrastructure and highly-specialized security needs. GE's Inspection Technologies offers a wide spectrum of capabilities in the area of advanced nondestructive imaging to help governments identify and quantify problems early. Our applications experience includes a wide range of government assets from borders to buildings and bridges to bio-tech research.

Military hardware

Gun barrels, cannons and mortar tubes are routinely inspected, both pre-service and after repeated use in the field, using remote visual inspection, digital X-ray, eddy current and phased-array ultrasound. Other valuable military weapon systems, including tanks, body armor, artillery and weapons can be inspected and analyzed for integrity and fitness for service. 2D and 3D micro-focus X-ray is used to inspect high-reliability electronics associated with space flight, advanced weapons and targeting systems.

High-tech research

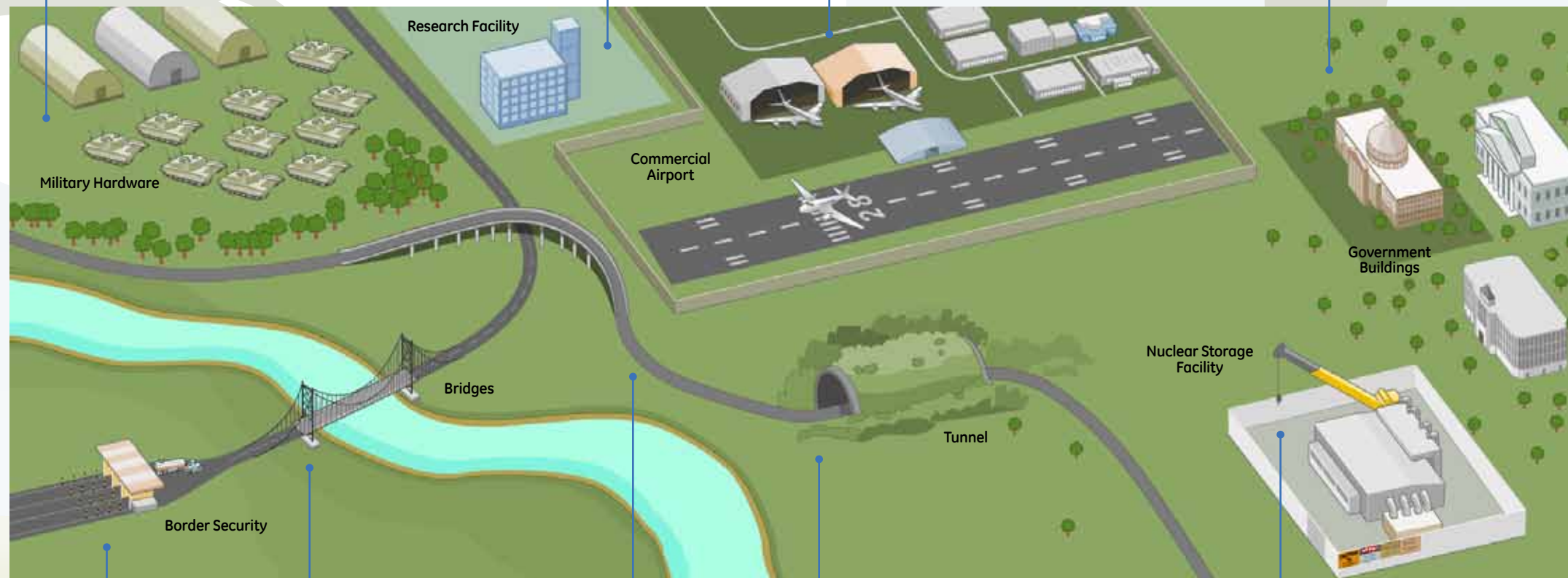
Our computed tomography delivers precise information about the integrity, shape and geometry of an object on both the surface and internally. This technology reduces development time during R & D and combines measurement and inspection solutions within production.

Port and airport security

Highly portable, fast and easy-to-use digital X-ray equipment is used at airports to interrogate suspect packages. RVI equipment can be used to look into cavities and tankage on boats, ships and packages at their port of entry for contraband detection and other illegal/smuggling activities.

Security

For over 20 years now, our RVI equipment has been used by federal and state governments including police, SWAT teams and bomb squads to perform specialized inspections and surveillance in hard-to-access areas. Our portable and easy-to-use videoprobe equipment helps keep government officials safe, whether at home or when traveling around the world. Similarly, intelligence agencies use our equipment to help collect information necessary to prevent or prosecute criminal or terrorist activity.



Border crossing

Portable x-ray, modified low-frequency ultrasound and remote visual equipment are used routinely at border crossings and security check-points to locate contraband or other illegal smuggling. The war on drugs, money laundering and terrorism is being fought using these advanced imaging technologies.

Highways, bridges and tunnels

Both for new construction and for aging infrastructure, safety-critical structures, monuments and signage can be field inspected for condition. Heat exchangers, chillers, boilers, HVAC and back-up power generation are inspected with ultrasound, eddy current, remote visual and X-ray for integrity and reliability to help meet government's 24X7 availability and national security needs.

Nuclear waste storage and decommissioning

Cold-war legacy sites and nuclear fuel storage or recycling facilities are dealing with a very wide range of technical issues concerning structural health of assets such as tanks, vessels, piping, heat exchangers and hot cells. Our ultrasonics, 2D and 3-D radiographic, eddy current and remote visual tools play a critical role in condition assessment.

Inspection products that deliver

GE's Inspection Technologies offers the most comprehensive selection of testing & inspection capabilities and other products for many industry applications. Our strength lies in the use of field experience and customer feedback to build the most productive NDT products in the market.

Electromagnetic

We offer a complete range of instruments, testing machines and probes for industrial applications requiring surface and sub-surface crack detection and metal sorting. Our non-destructive Electromagnetic testing equipment and solutions meet the critical requirements of your application and deliver productivity and quality.

(See more details on page 13)

Radiography

We offer a comprehensive range of industrial radiographic equipment and techniques from film to digital, analytical to metrology and X-ray generators to integrated test machines, including 3D computed tomography. We will work with you to identify the most appropriate solution to ensure optimum technique performance, speed and economy for your application.

(See more details on page 14 & 15)

Ultrasonics

We offer ultrasonic testing equipment, testing machines, instrumentation, transducers, and software for industrial applications requiring internal defect detection and sizing. Our non-destructive ultrasonic testing solutions will meet the critical requirements of your application and deliver productivity and quality.

(See more details on page 16 & 17)

Remote Visual

We offer a comprehensive selection of remote viewing equipment, from basic borescopes and fiberscopes to measurement capable digital video borescopes, pan-tilt-zoom camera systems and robotic crawler systems. We have the right visual inspection equipment for your needs for any industry. Our systems are portable and ruggedly built to survive the rigors of industrial environments.

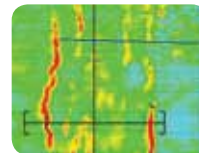
(See more details on page 18)

Software Solutions

We offer advanced and user-friendly software that improves productivity by enabling you to make smarter and quicker decisions in the field and in the office. We offer software for all NDT applications and testing methods, including software for data input, analysis, image review, reporting, data management, remote collaboration and storage. Browse our software offerings to learn more.

(See more details on page 19)

superior imaging
quality
asset health
data management



Electromagnetic (EM) Testing Solutions

Electromagnetic is a fast, accurate, cost-effective electro-magnetic NDT method for detection of surface or near surface flaws and for heat treatment verification. It is used for the inspection of raw materials, quality control of finished products and for maintenance inspections.

Apollo™ Electromagnetic (EM) System

Apollo is a multi-channel/multi-frequency Electromagnetic instrument for inspection of heat exchanger tubing. It supports industry standard Electromagnetic (ET) and remote field (RFT) tubing probes as well as surface scanning arrays for wide area inspection.



Apollo Electromagnetic inspection system includes data acquisition and analysis software tools for rapid instrument setup and result interpretation

Conductivity measurement

Accurate and repeatable checking of non-ferrous metals for identity, grade and material conditions. We offer portable, lightweight and rugged instruments with digital displays.



AutoSigma 3000 electrical conductivity meter

Portable instruments

A range of portable and rugged instruments provides high and low frequency inspections for defect detection, conductivity and coating thickness measurement, including dual frequency inspection and dynamic rotating drive capabilities.



Aircraft inspection with the Phasec 3 series flow detectors

Eddy Current Array

Our eddy current array flow detectors are designed for high frequency surface inspection to low frequency sub-surface inspection. Portable and lightweight, our detectors offer full phase functionality, including conductivity measurement, with easy to read output for better signal interpretation.



Eddy current surface and subsurface inspection for flaw detection in metals

Probes

We supply a wide range of standard Electromagnetic probes and coils for our Electromagnetic instruments. We also offer ID tubing probes for heat exchanger inspection in refineries, petro-chemical plants and power utilities.



ID probes for balance-of-plant, ferritic and non-ferritic heat exchanger tubing inspection

Aircraft Wheel Inspection

Our WheelScan system ensures scanning coverage, improves inspection accuracy and repeatability and provides full documentation of setup parameters and test results.



Aircraft wheel inspection with WheelScan 5

Radiographic Testing (RT) Solutions

Radiography is widely regarded as one of the most reliable and proven non-destructive testing methods. It offers unique benefits, such as revealing changes in thickness, internal and external defects, interior assembly details and more. We offer conventional film radiography, digital technologies, portable and stationary X-ray sources, integrated inline systems, 3D computed tomography, metrology solutions and analytical X-ray diffraction systems.

Film radiography

Traditional X-ray methods require the use of film. GE offers one of the most comprehensive ranges of radiographic films, processing equipment and chemicals, perfectly matched to ensure optimum performance.

We are the exclusive supplier of the world-renowned Structurix, Industrial radiographic film from Agfa. No object is too large or too small—as film can be tailored to meet specific needs.



Oil & gas weld inspection using film

We are committed to continuously investing in R&D to deliver solutions to satisfy our customer's needs. The introduction of Structurix ECO Film System meets the demand to lessen cost and environmental impact by lowering chemical consumption, increasing film throughput and reducing energy usage.

Our film systems are compliant with industrial film system classification standards, such as BAM. All of our products are backed by our extensive worldwide distribution and service network, ensuring fast delivery and comprehensive technical support.

Industrial X-ray tubes and generators

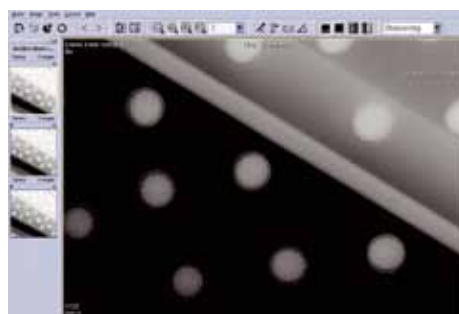
160-300kV portables and 160-450kV stationary equipment with directional or panoramic tubes and different combinations of focal spot sizes provide the appropriate X-ray source to meet your specific requirements. In addition, we offer a complete line of micro- and nano-focus X-ray generators and tubes.



Inspection of ship assemblies using industrial X-ray

Digital Radiography

As technology continues to advance, digital radiography solutions replace many traditional film applications offering distinct advantages, such as fewer consumables, shorter exposure and processing times, as well as being more environmentally friendly. We offer a broad portfolio, including film digitizers, computed radiography scanners, automated digital detection solutions, 3D computed tomography systems and more.



2D radiography image of turbine blade

Computed Radiography (CR)

Our wide range of CR scanners, imaging plates and software solutions provide an overall imaging solution to our customers.

In addition, we offer proprietary high-performing CR imaging plates for a wide range of NDT applications.



CR*Flex computed radiography scanner

Digital Detector Arrays

GE utilizes a variety of digital detector arrays to ensure optimal image quality and throughput for each application. We have the unique advantage of designing and manufacturing detectors internally, allowing us to influence every stage of the process to provide a solution tailored specifically for industrial applications.



Detector array installed in a testing machine



Integrated Systems

GE offers complete turnkey X-ray inspection systems based on 2D X-ray and 3D computed tomography for inline applications in the manufacturing process, as well as laboratory-installed systems. These testing machines are designed to provide fast inspection times for maximum throughput.

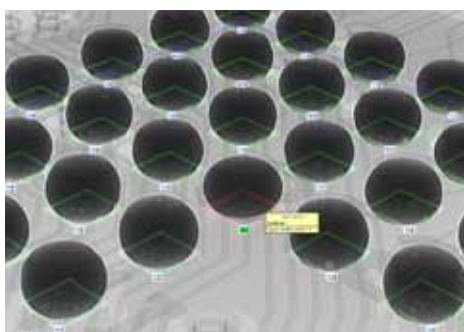
Many applications can optimize productivity by adding automation through robotics or other material handling devices. Software tools, such as automatic or assisted defect recognition, can be added to minimize errors and maximize productivity.



X-cube[®] is a highly versatile 160/225 KV inspection system

Electronics

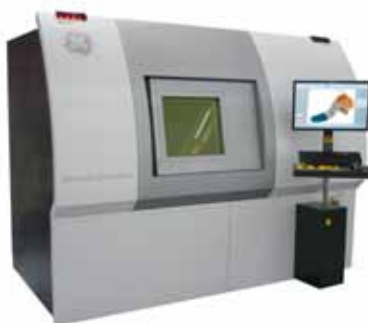
The reliability of electronic assemblies strongly depends on solder joint quality. Even if they are not directly visible they can easily be automatically inspected by advanced micro-focus and nano-focus X-ray systems. Detail detectabilities in the submicron range ensure detecting hidden defects in electronic packages.



2D X-ray inspection: open BGA joint

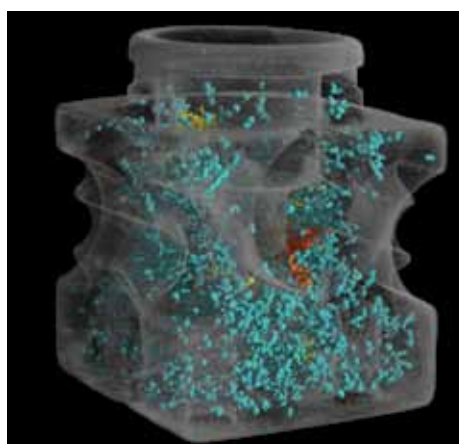
3D Computed Tomography

2D X-ray inspection and 3D computed tomography complement each other, and when combined, are a very useful inspection tool for a wide range of industrial quality assurance inspection tasks.



Phoenix v|tome|x L 450 3D computed tomography inspection system

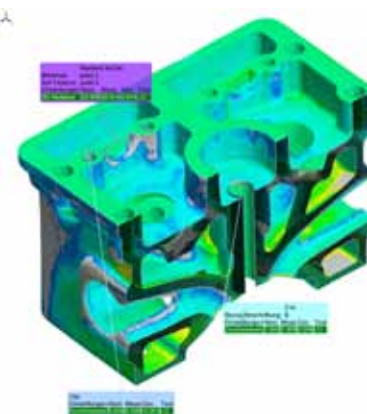
Traditionally, X-ray testing reveals defects in castings, including gas holes, shrinkages, foreign materials and discontinuities without destroying the object. Computed tomography provides another important advantage—it shows the exact location of the defect inside the sample. The 3D data allows quantitative defect analysis of the sample. This provides information on size, volume and density of inclusions and cavities. CT images are also richer in contrast; therefore, revealing even smaller defects.



Automatic pore analysis of a casting

Metrology

High precision 3D metrology with computed tomography offers considerable advantages over conventional coordinate measuring machines, especially when measuring complex parts with hidden or difficult-to-access surfaces, such as high density of measurement points and fast capturing of the complete internal geometry of the object.



3D metrology with CT: CAD-variance analysis

Analytical X-ray

GE offers X-ray diffraction (XRD) equipment used to reveal material characterization information in a variety of lab and production applications, including residual stress analysis and determination of the orientation of single-crystal materials.



XRD stress analyser with Meteor1D detector

Ultrasonic Testing (UT) Solutions

Ultrasonic testing is a versatile non-destructive evaluation method using high frequency sound beams to help detect internal discontinuities in a wide range of materials, including metals, plastics and composites. It is widely used for testing welds, forgings, bars/billets, tubing and tanks for corrosion.

Flaw detection

Flaw detection is a fast and accurate inspection method to evaluate internal product integrity. Ultrasound penetrates deeply into materials searching for defects, cracks, delamination, lack of bonding and other discontinuities. A full range of portable flaw detectors is available, including an upgradeable solution combining conventional flaw detection with phased array.



USM Go/DMS Go portable ultrasonic flaw detector and thickness gage in one

Hardness testing

An extensive range of portable instruments provide on-site hardness testing, in different scales, with applications ranging from thin coatings to large and heavy cast components.



DynaPocket hardness tester

Thickness gaging

These useful and productive tools are designed to help improve safety and ensure reliability of equipment and material subject to corrosion or erosion.



DM5E ultrasonic thickness gaging of pipes

Transducers and solutions

GE offers more than 4,000 standard transducers, including contact, immersion, angle beam and single/multi-element probes for virtually all flaw and thickness inspection applications. Standard and phased array probes are available for North American and European specifications.



Ultrasonic transducers

Corrosion monitoring sensors

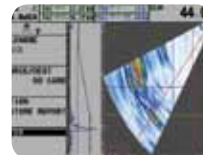
Sensors continuously monitor wall thickness of oil & gas high temperature pipelines while providing frequent and reliable information for decision making.



Rightrax™ permanently-installed sensor on oil & gas pipe section



USM Vision is a total weld inspection solution for pipework fabrication



Testing machines

Complete turnkey ultrasonic inspection systems support both on-line and off-line applications in the manufacturing process, as well as mobile systems for field applications. These testing machines are designed to provide the fastest inspection times for maximum throughput to cover the complete product range and to meet major international testing standards.

Depending on the test task, all ultrasonic technologies from single probe to multiple channel and multi-probe phased array are applied. All in-line testing machines have an interface to the material handling devices and to the customer's computer network. Testing results are evaluated in real-time, documented in different formats and allow further processing.

Instrumentation

From single channel instruments for precision immersion tank applications to multi-channel and phased array instruments for demanding, high production environments, we offer a wide range of system level ultrasonic instrumentation for virtually every industrial application, including precision inspection of critical aircraft engine parts, automotive components and high-speed in-line profile, pipe and weld inspection.

All systems instruments provide a variety of I/O including, TTL and analog outputs and test data release functions to interface with existing customer equipment. Software development kits are also available to build custom interfaces from the instrument and your application software.



Weldstar mobile ultrasonic inspection system



SNUP ultrasonic pipe testing system



Phased Array Squirter with robots



GRP ultrasonic tube and pipe testing system



ROTA ultrasonic bar, tube and pipe testing system



Multi-channel ultrasonic instrumentation

Remote Visual Inspection (RVI) Solutions



RVI is a cost-effective inspection technique used to capture real-time views and images from inside voids such as tubes, pipes, machines, engines and enclosed structures. RVI can be a complementary technique to other NDT disciplines and is frequently used as the primary inspection method.

Video borescopes

We offer an array of technologically advanced video borescopes, from the most portable to the most capable—all designed for ease of use while delivering video images of unsurpassed quality.

Distinguished by an intuitive, patented joystick and one-handed operation, these systems feature integrated LCD video and a variety of imaging and measurement options. Video borescopes, like our XL Go+, are engineered for durability and available in many diameters and lengths.



Large gas turbine inspection with the XL Go+ VideoProbe®

3D Phase Measurement

Now available with the XLG3 Video Bore-scope, 3D Phase Measurement provides accurate 3 dimensional surface scans allowing measurement of all aspects of surface indications. Inspectors can view and measure a defect using a single probe tip, eliminating the extra steps required to back out, change the tip and then relocate the defect. In effect, the 3D Phase Measurement provides accurate measurement "on-demand" while simplifying the inspection process. Profile View is a cross section view of a portion of the surface. With Profile View, the inspector can rotate and zoom to get a more accurate view of the defect. The ability to better visualize the shape and characteristics of an indication allows for well-informed decision of serviceability of the asset.

Menu Directed Inspection

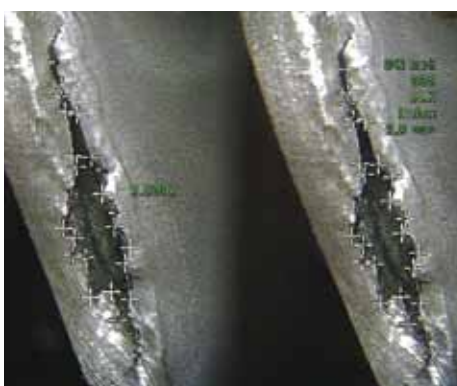
Menu Directed Inspection (MDI) is one of the first software tools to standardize the inspection process in the NDT industry. An XLG3™ or XL Go+ VideoProbe® system operating MDI software helps guide inspectors through the inspection process, intelligently auto-generates reports and organizes inspection results, decreasing reporting time up to 70%, improving quality and increasing productivity.



Aircraft engine inspection using the XLG3™ VideoProbe



Sample inspection Menu Directed Inspection list selection screen



StereoProbe® area measurement screen shot from XLG3 VideoProbe

Pan-Tilt-Zoom (PTZ) cameras

GE has a full range of rugged industrial PTZ cameras for remote viewing in large areas. They feature three interchangeable zoom camera head diameters with high-intensity lighting, pan-and-tilt mechanisms and industrial waterproof packaging for protection from extreme environments.



Inspecting chemical plant vessel with Ca-Zoom® PTZ inspection system

Rigid borescopes

Detect irregularities in castings, ensure the structural integrity of an aircraft engine or take a quick look in an application with "straight line" access—nothing gets by the exceptional clarity and high precision optics of our rigid borescopes. Our scopes are very durable with all-metal construction and a triple tube shaft design built to withstand harsh environments.

Flexible fiberscopes

Our line of fiberscopes range from 8.0 mm to 1.5 mm diameter for fast access in the smallest areas. Featuring high-resolution image bundles and durable tungsten jacket construction, these simple inspection devices provide a window into otherwise inaccessible locations.

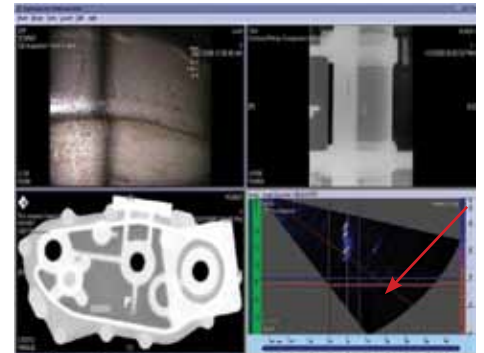


Software Solutions

GE's Inspection Technologies business provides the tools to take you from data to decision. Our advanced software solutions assist you with collecting high-quality data for subsequent review and analysis in field and factory manufacturing applications to make critical decisions. Our software covers all NDT applications and testing methods, including software for data input, analysis, image review, reporting, data management, remote collaboration and storage.

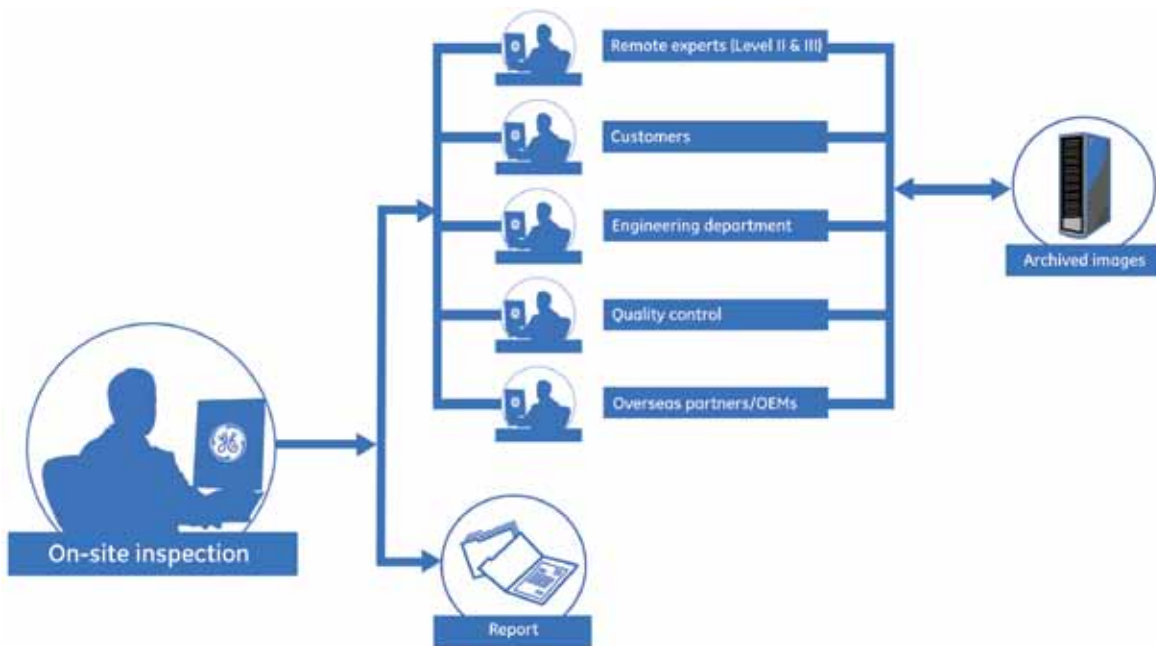
Rhythm Software Suite

Our Rhythm® intelligent software platform along with image enhancement & measurement tools can help you integrate NDT data & images with other relevant information. The Rhythm suite is a user-friendly software tool that offers advanced image review tools and data management for all remote visual inspection, ultrasonic, X-ray (including computed radiography, digital radiography and film digitization), and electromagnetic testing methods. Its advanced data sharing capabilities allow significant improvements in productivity and help enable faster identification of quality problems, leading to reduced production defects and/or better in-service asset management.



Rhythm Review screen

The Rhythm platform is based on Digital Imaging Communication of Non-destructive Evaluation (DICONDE) providing the ability to have multiple modalities in one platform operating in an industry standard, non-proprietary data format.



Menu Directed Inspection (MDI)

Menu Directed Inspection (MDI) is one of the first software tools to standardize the inspection process in the NDT industry. An XL Go+™ or XLG3™ VideoProbe® system operating MDI software helps guide inspectors through the inspection process, intelligently auto-generates a report and organizes inspection results—saving time, improving quality and increasing productivity.

Application Specific Software

We offer application specific software to enhance defect detection. For example, our automatic defect recognition (ADR) provides unattended or redundant X-ray inspection of light-metal castings. This software can be used with different X-ray detectors, such as flat-panels or image intensifiers and is also available for off-line result analysis and optimization.

For example, our easy-to-use specialized software packages for ultrasonic testing inspection manage part scanning, ultrasonic signal acquisition and provide imaging tools for off-line analysis. In addition, we offer 3D rendering software to help identify and size defects and for 3D metrology.

Applications Engineering & Support

GE's Inspection Technologies has enormous breadth and depth of experience in the application of non-destructive testing technologies to real-world challenges. Our legacy brands date back over 100 years of NDT history. We have solved ten's of thousands of applications ranging from broad-based generic to highly customized and even unusual applications. As your partner for NDT solutions, we can provide a wide experience and broad product/software offering you the best solution to your challenges – increasing your productivity and improving your bottom line. Please refer to our application-specific web pages and informational brochures for more information.

Big 5 Applications



Welds

GE has conventional and phased-array UT, including test machines, film and digital radiography, Electromagnetic and remote visual technologies for new build, in-service or life extension engineering of welds.



Corrosion

GE offers simple hand-held digital UT thickness gages, digital and phased-array UT flaw detectors, and X-ray products for corrosion and erosion detection, and sizing. Our Rightrax monitoring system permanently installs on suspect areas to alarm you of trouble spots before a failure can occur.



Rotating equipment

We offer the broadest selection of NDT modalities, including Electromagnetic arrays, 3-D volumetric CT, advanced menu-directed RVI and Rhythm software for inspection data trending and archiving of gas and steam turbines, compressors, pumps and electrical generators.



Heat exchanger

Nuclear steam generators, condensers, feed water heaters, air-conditioning chillers and other balance-of-plant heat exchangers experience degradation over long-term use. GE can assist you in diagnosing almost any heat exchanger problem with our wide inspection capabilities.



Composites

Whether for airframe components on military or commercial aircraft, large rotating blades on aircraft engines and windmills or piping systems, GE has developed significant expertise for enhancing the inspection process with composite materials.

Customization



Flanged-face corrosion using ultrasonics

Flange-face corrosion is a big problem for refineries and chemical plants. Our custom ultra-narrow, phased-array ultrasonic transducers combined with custom software templates tailored to specific flange geometries can significantly increase inspection productivity (speed and probability of detection) in this tough field environment.



Electromagnetic testing of turbine dovetails

Electromagnetic array probes and MC/MF instrumentation designed specifically for 3-D geometry of turbine blade rotor dovetail joints can significantly increase probability of detection while improving inspection productivity and documentation.



Secondary-side via RVI

Secondary-side nuclear steam generator (heat exchanger) inspections are aided by this custom-designed 2.7 mm (0.106") wide video borescope. With image resolution 15X better than traditional fiber-optic systems, inspection data is easier to interpret, facilitating better informed decision making for tube sheet or support plate cleaning and loose parts retrieval activities.



Metrology with Computed Tomography

Volumetric Computed Tomography (3D CT) is used in conjunction with advanced manufacturing techniques for both inspection and metrology needs. GE offers customized solutions including low-volume, proof-of-principal product inspection services to validate the test technique.

Service Solutions

GE's Inspection Technologies provides a wide array of service solutions across multiple modalities and industries. From equipment repair, spare parts, product calibration, on-site remote visual inspection, equipment rental, training, custom service agreements and preventative maintenance, we have the correct service solution to help keep your inspection operations up and running.

Repair and calibration

We provide a full lineup of equipment repair and calibration services. Our global team utilizes proven analytical tools to quickly repair or calibrate your equipment to ensure its availability. On-site calibration is available and can be done to your specifications. Traceable calibration certificates are available as well.

Preventive maintenance

Periodic maintenance, if neglected, could result in unnecessary production outages. GE can show you how to avoid unnecessary downtime with a comprehensive set of component inspections and sub-system tests, tailored to the design specifications of your equipment. We can schedule our services to meet your needs and the specific needs of your equipment.

Spare parts

As one of the leading manufacturers of NDT test equipment, GE is able to support the performance of your equipment by offering genuine spare parts as supplements to your parts inventory or as required to maintain your equipment. The utilization of global warehouses and parts centers provides quick delivery to your location.

Applications centers

Our Application Centers bring together worldwide knowledge and experience to help our customers quickly solve their application challenges. Our engineers, technicians and specialists possess a broad knowledge encompassing many NDT technologies and many industry segments to develop specialized inspection solutions.

NDT training and on-line programs

Our training organization, based in the United States and Europe, offers classroom instruction, on-site training and on-line courses for digital and film radiography, ultrasonic, remote visual inspection and electromagnetic. Level-I and II and product training is available for all NDT modalities, as is customized instruction.

If you cannot travel to our training schools, we bring them to you. We offer global on-line training programs for convenient learning at your own pace. Visit our website for the latest details about Inspection Academy, including a variety of e-learning options.

On-site remote visual inspection service

Our staff of experienced remote imaging specialists, equipped with the latest remote visual inspection equipment, is available around the clock. They can assist during planned and unplanned outages, preventive maintenance, emergency services or with state or federal compliance issues.

Service agreements

Control your equipment costs, reduce operational risks and help ensure performance with a custom service agreement. Regardless if you own a single portable instrument or numerous advanced testing machines, we can design a service program that locks in your long-term service costs.

Equipment rental

Our rental program allows customers temporary access to needed equipment on a temporary basis. We offer ultrasonic, Electromagnetic, radiography and remote visual inspection equipment for rental. Commercial arrangements are available for daily, weekly, monthly or yearly equipment needs.



Regional Offices

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GE's Inspection Technologies has sales and service offices all over the world. Below are some of our locations. Visit www.geinspectiontechnologies.com, email: geit-info@ge.com for a complete listing.

- Buenos Aires, Argentina
- East Perth, Australia
- Berchem, Belgium
- Airdrie, Alberta, Canada
- Montreal, Quebec, Canada
- Toronto, Ontario, Canada
- Prague, Czech Republic
- Milan, Italy
- Mexico City, Mexico
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- Houston, Texas, US

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