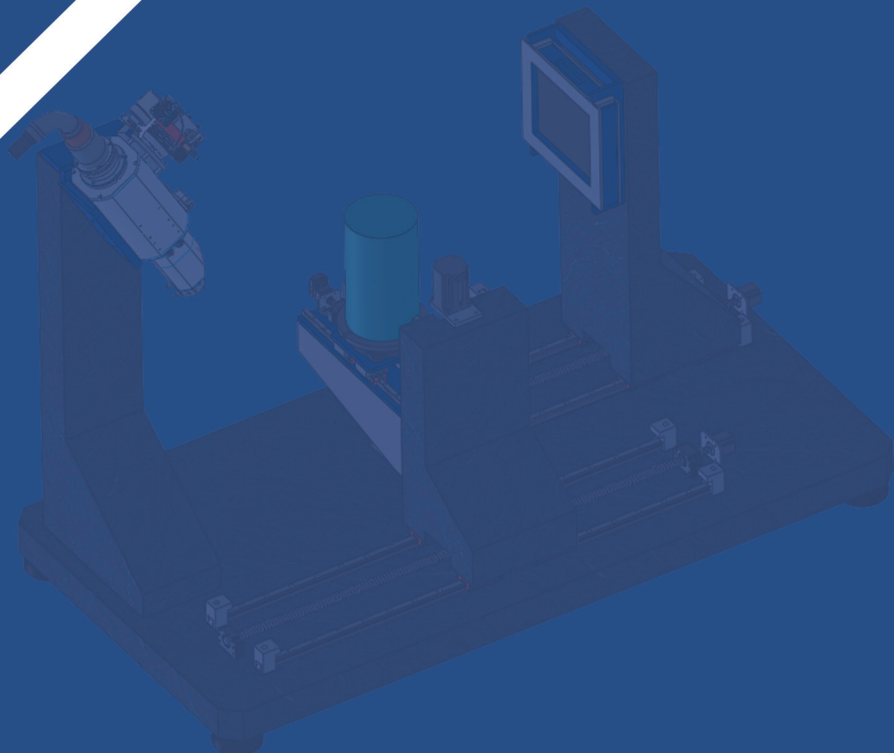


MQCT Series Computed Tomography Solutions



Computed Tomography Solutions

Whether it's high volume manufacturing or critical research & development applications, quality is of paramount importance. To ensure defect free operations, you can rely on our fully customised CT solutions for a wide range of industrial applications.

Our range of products covers everything from small, specialized parts to rocket motors and propellants. Uncover defects from even the most difficult-to-reach areas, with stunningly detailed 2D and 3D imagery offered by our Computed Tomography Solutions.

At MQS, we engineer precision CT equipment to enlarge the tiniest abnormality. Quickly expose

imperfections in your most critical parts with confidence by switching to our Cabinet based CT units. When multiple parts are to be inspected rapidly, our cabinet-based CT systems offer the speed and precision that your industry relies on. Utilizing the integrated MQS Imaging Suite, your intense workflows can be sustained even during a heavy production cycle.

MQCT systems offer the much-needed flexibility of the latest technological advancements, by performing complex metrology and inspection tasks simultaneously. With defect analysis and feedback, defect-free production is achievable.

CT Inspection Solutions

3D Computed Tomography (CT) allows you to see and examine an object's external and internal structures in 3D volume. With our proprietary Imaging software, the CT system takes multiple 2D projections covering the complete object. The Imaging Software presents manipulator controls, X-Ray parameters, and

automation processes intuitively to ensure maximum ease-of-use and precise results. MQS Technologies focuses on helping you inspect your product in record time – improving your quality and efficiency.

System Configuration

X-Ray Source

Micro / mini focus X-Ray tubes and linear accelerators are used in aerospace, automotive, electronics industry, heavy engineering, and scientific research. Typical applications are the high-resolution computed

tomography of electronic and mechanical components, the testing of weld seams and investigation of castings by digital radiography (DR), and 2D and 3D inline X-Ray inspection.

X-Ray Energies

Micro focus tubes	:	Up to 300KV
Mini focus tube	:	Up to 450KV
Linear Accelerators	:	0.95MeV–15MeV
Dual Tube/ Multi tube	:	Configurable

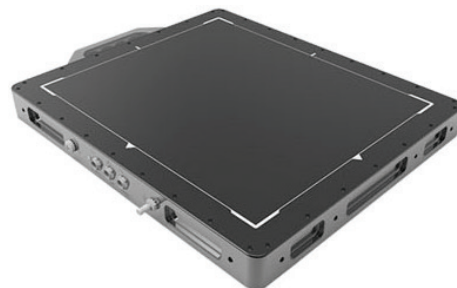


X-Ray Detector

The next generation of the XRD family of flat panel detectors provide real-time imaging up to 30fps while maintaining an industry leading 16-bit contrast

resolution. Extensively used for industrial non-destructive testing (NDT, cone beam CT (CBCT) and metrology.

Scintillator	: CsI or Gadox scintillator options
Detector Size	: Up to 427mm X 427mm (Sizes based on the model)
Pixel Size	: 100µm – 200µm
Maximum Energy	: CsI - up to 225KV / Gadox scintillator-up to 16MeV
A/D Converter	: 16Bit
Grade	: Standard / CT / ASTM
Qualifications	: ASTM E2597, 2737 etc.



Optional: Dual Detectors (Digital Flat Panel Detector and Line Detectors)

Line Detectors:

Linear detector arrays (LDAs) provide superior image quality through optimized photodiode and electronics designs and careful material selection. The high absorption scintillator material and perfectly matching photodiode and readout electronics enable excellent X-Ray sensitivity. The modular linear detector arrays are scalable to different inspection system lengths up to 4.1meters with one controller and a single Gigabit Ethernet interface. With network-connected units, even longer scanners can be built efficiently for high-energy applications.

X-Scan H series provides low ring artifacts by uniform and linear X-Ray response, together with the wide dynamic range. In addition, minimized pixel to-pixel cross-talk and a unique pixel separation design eliminate scatter effects effectively.

The plug-and-play type series comes in 0.2 and 0.4 mm pixel pitches and three module lengths of 410, 614, and 820mm. The module housing includes built-in X-Ray scatter shielding and a collimator for applications from 30kVp to 9MeV.

Key Features

- ▶ Pixel pitch options: 0.2mm and 0.4mm
- ▶ Dynamic range >16000:1
- ▶ Scintillator material pixelated CdWO₄
- ▶ Gigabit Ethernet interface
- ▶ Diagnostic functions



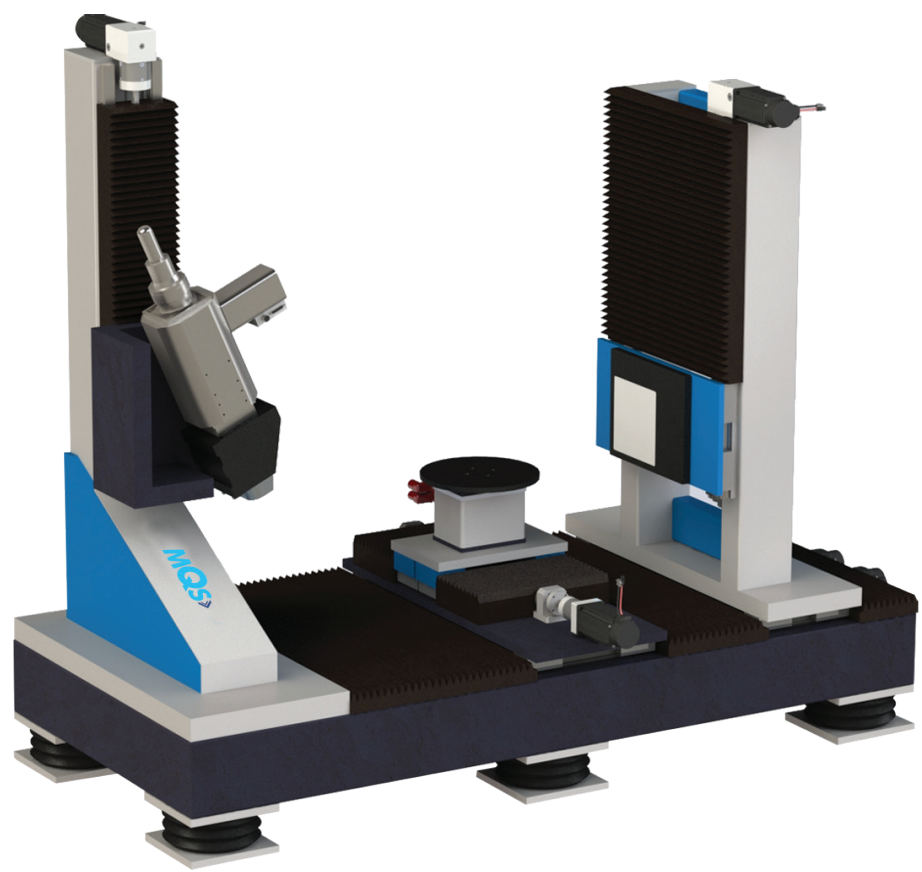
Standalone Manipulators

Standalone manipulators are designed for use in legacy cabinet systems or concrete bunters with greater flexibility to use the system’s existing features.

Tube Manipulator*	: X, Y and Z Axis
DFPD Manipulator*	: X, Y and Z Axis
Object Manipulator*	: X, Y, Z, tilt and C Axis
Diameter of Object	: Customizable as per the size of sample
Construction*	: Granite base with Extruded / Sheetmetal-based Aluminum on machined casting plates

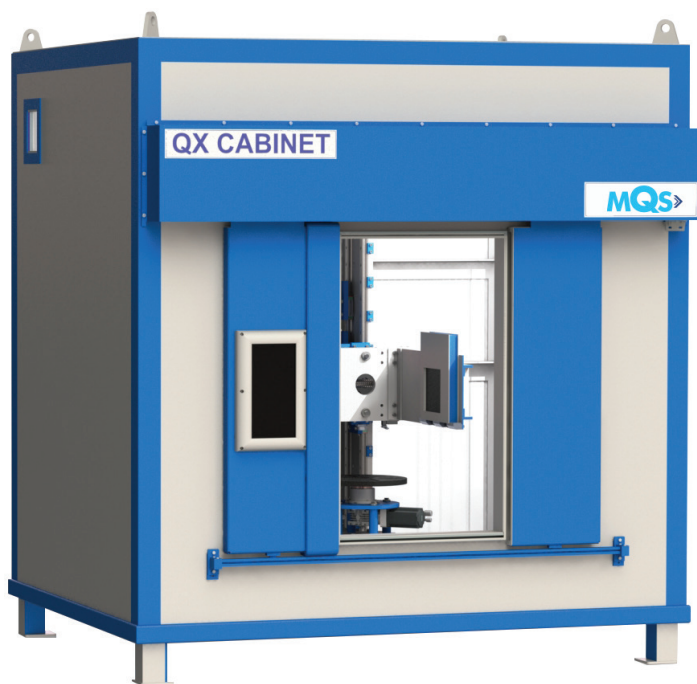
Key Features

- ▶ High Precision manipulators for CT applications.
- ▶ High accuracy rotary table.
- ▶ Suitable for realtime inspection.
- ▶ Fully automated, servo motor controller with position feedback. Also available with flame proof option.
- ▶ Ease of usage - Position along all axis can be preset and recalled, thereby saving time and labor for large object inspection / production jobs.
- ▶ User Friendly - Easily operable touch controller with motion animation.





*Manipulator axis with strokes is designed as per the sample requirement and may vary for each configuration.



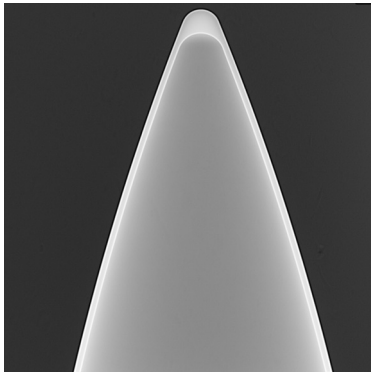
X-Ray Cabinet

Key Features:

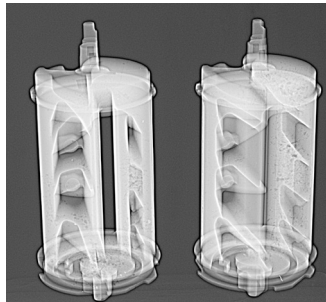
- ▶ Custom designed to suit customer specific inspection requirement
- ▶ Manufactured with Steel / lead / steel construction
- ▶ Lead Glass window for viewing (optional)
- ▶ Meets National (AERB) and International standards with leakage less than $1\mu\text{Sv}$
- ▶ Motored sliding doors with safety light Curtains and Door limit switches
- ▶ CCTV monitor for monitoring and recording the entire process of inspection inside the cabinet
- ▶ Provision for lifting of Cabinet for positioning in Production floors

Imaging Software

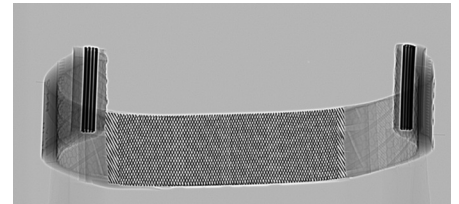
MQS Imaging Suite (MIS) offers 2D and 3D CT projection acquisition and image processing with a user-friendly interface. MIS software is packaged with X-Ray source control, manipulator control for automation and image processing.



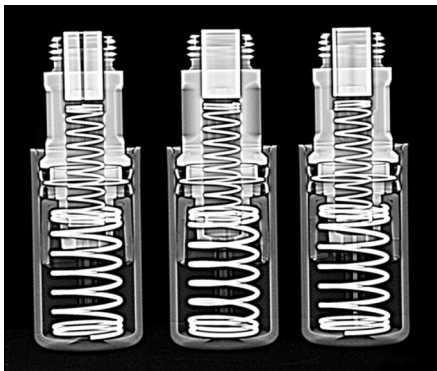
Radome



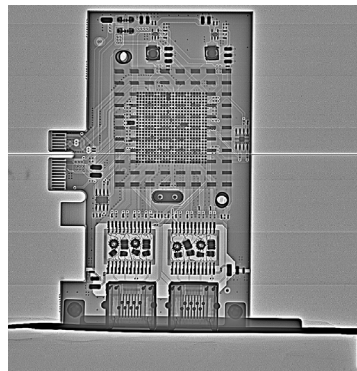
Aluminum Component



Tyre



Automotive Component



PCB



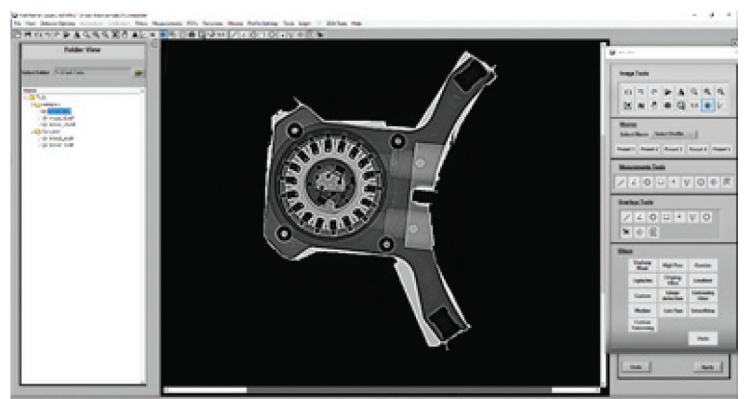
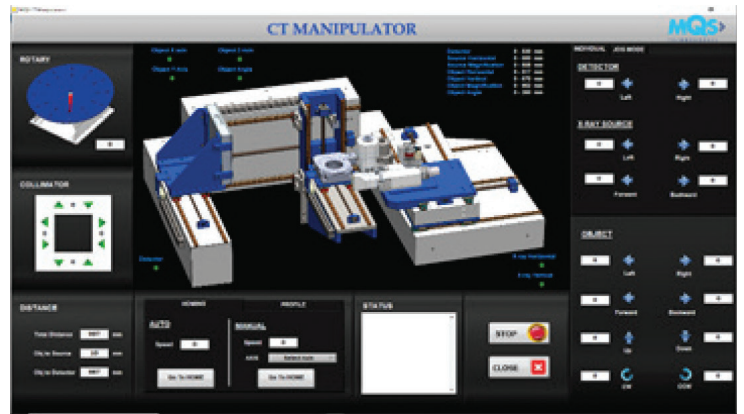
Battery

Key Features

Perform 3D Analysis effortlessly with our range of single- and dual-energy systems and software. We make it easy to run structural and Porosity analyses on your prototypes and production parts. Our software assists you further in decoding every defect and ensuring quality. In conjunction with our cabinet-based CT systems, you can conduct in-house inspections as per your industry's demands for precision.

- ▶ Acquisition – Single Shot / Sequence / Continuous for 2D applications.
- ▶ Automated acquisition of projection data from CT manipulators for performing 3D reconstruction.

- ▶ Acquisition – Single Shot / Sequence / Continuous for 2D applications.
- ▶ Automated acquisition of projection data from CT manipulators for performing 3D reconstruction.
- ▶ Powerful Image Processing tools like Interactive windowing, Grayscale invert, Zooming, Flip / Rotate, ROI tool, Magnifier, Pointer, BNC, Reference imageviewer, thumbnail views & 3D plotting etc.
- ▶ Measurement & Analysis tools.
- ▶ Histogram tool to count and plot the total number of pixels at each grayscale level.
- ▶ Multiple storing formats - Line Profile tool to plot the variations of intensity along a line.
- ▶ Examining boundaries between components, quantifying the magnitude of intensity variations and detecting the presence of repetitive patterns.
- ▶ Built in MACROS (Presets) to automate an inspection task.
- ▶ All standard image processing filters.
- ▶ Facility to calculate detector characterization parameters such as SNR,CNR and BSRB
- ▶ DICOM Print facility both on Film and Paper.
- ▶ Calibration (offset, gain / multigain and Pixel).
- ▶ Advanced Filters set for enhanced image viewing capabilities and detecting the defects.
- ▶ Assisted defect evaluation.
- ▶ Programmable presets for Batch processing.
- ▶ Ease of interfacing with multi detectors
- ▶ Dual Monitor Configuration available.
- ▶ Multi image format saving.
- ▶ DICOM/DICONDE Compliant.
- ▶ Frame averaging, histogram correction, Pseudo coloring by threshold, line profile function, Multi user login
- ▶ Video recording / capturing in real time.



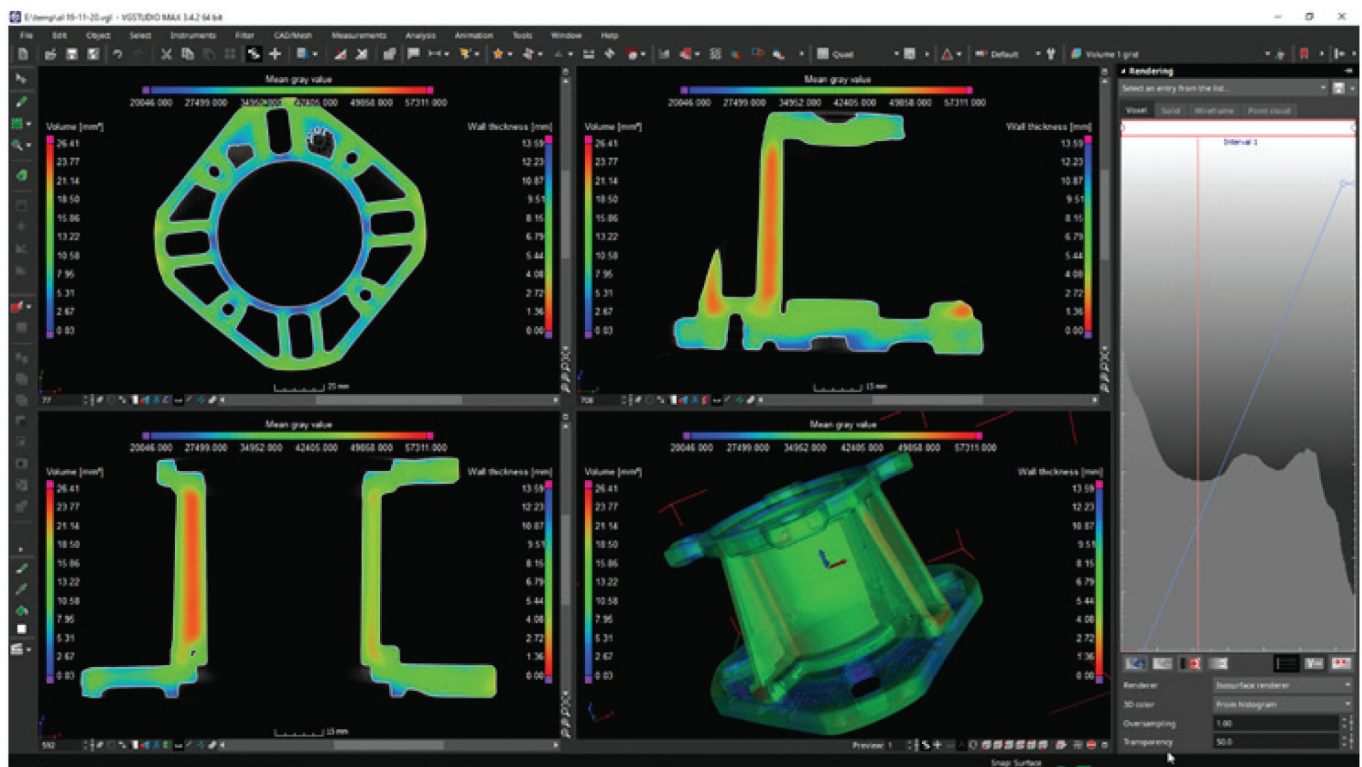
CT Reconstruction and Analysis

Ever enhancing industrial manufacturing techniques lead to higher complexities in parts. To manage this complexity - Defect analysis, reengineering and quality control are key elements. With the Volume Graphics, comprising of VGSTUDIO MAX, VGSTUDIO, VGMETROLOGY, VGinLINE, and myVGL, you can carry out all kinds of analyses and visualizations directly on data from industrial computed tomography (CT).

Volume Graphics software is used worldwide by customers in the automotive, aerospace, electronics, medical devices and consumer goods industries for

first article inspection reports, automated batch processing, and even inline process control.

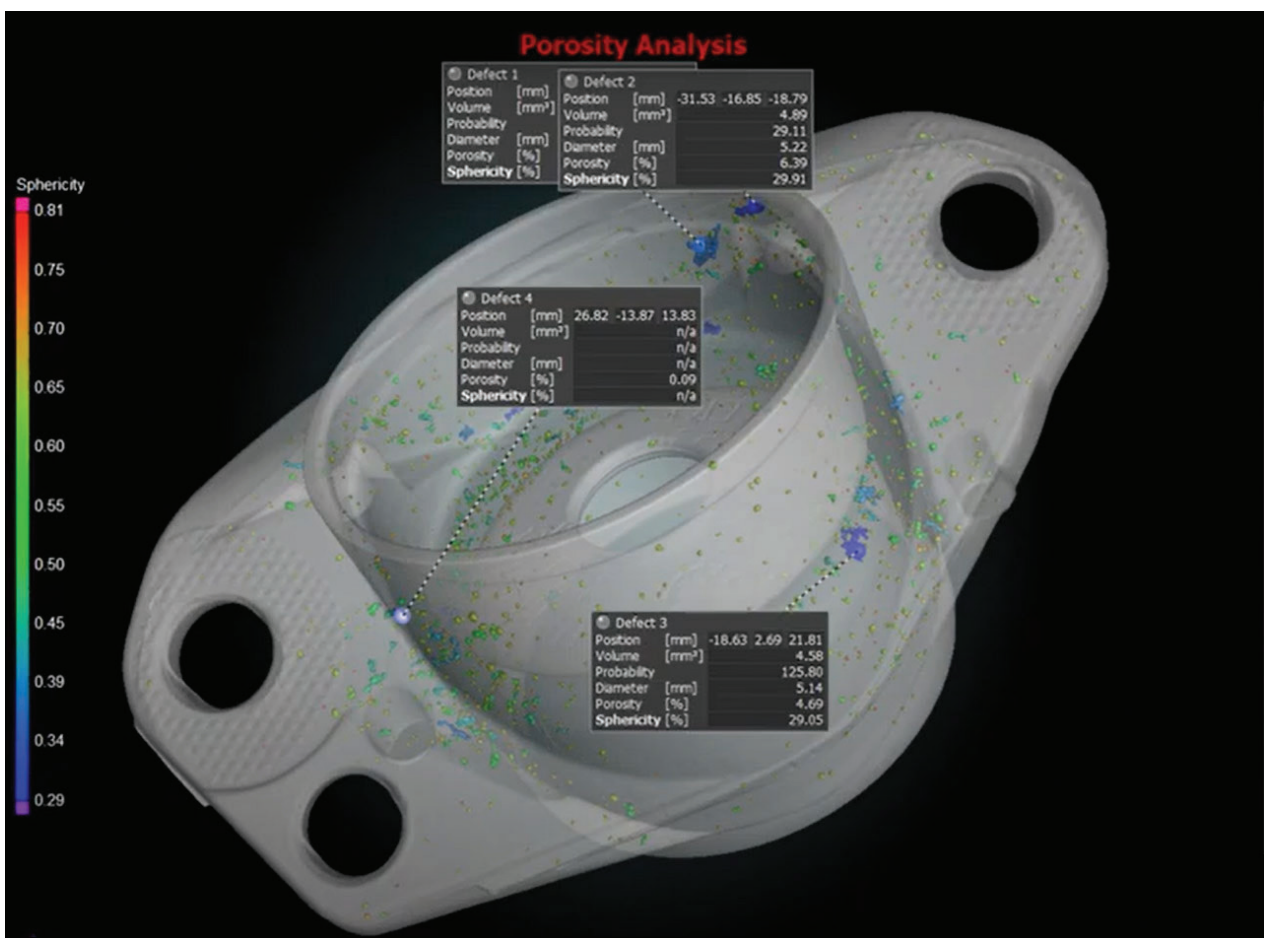
MQS CT System along with MIS and Volume graphics software offers a comprehensive and precise X-ray metrology device. The software gives you the most precise picture of all objects' surfaces you can get – and saves it in the very compact .mvgl format. This provides the most accurate metrology on original CT data with no trade-off between file size and the quality of information.

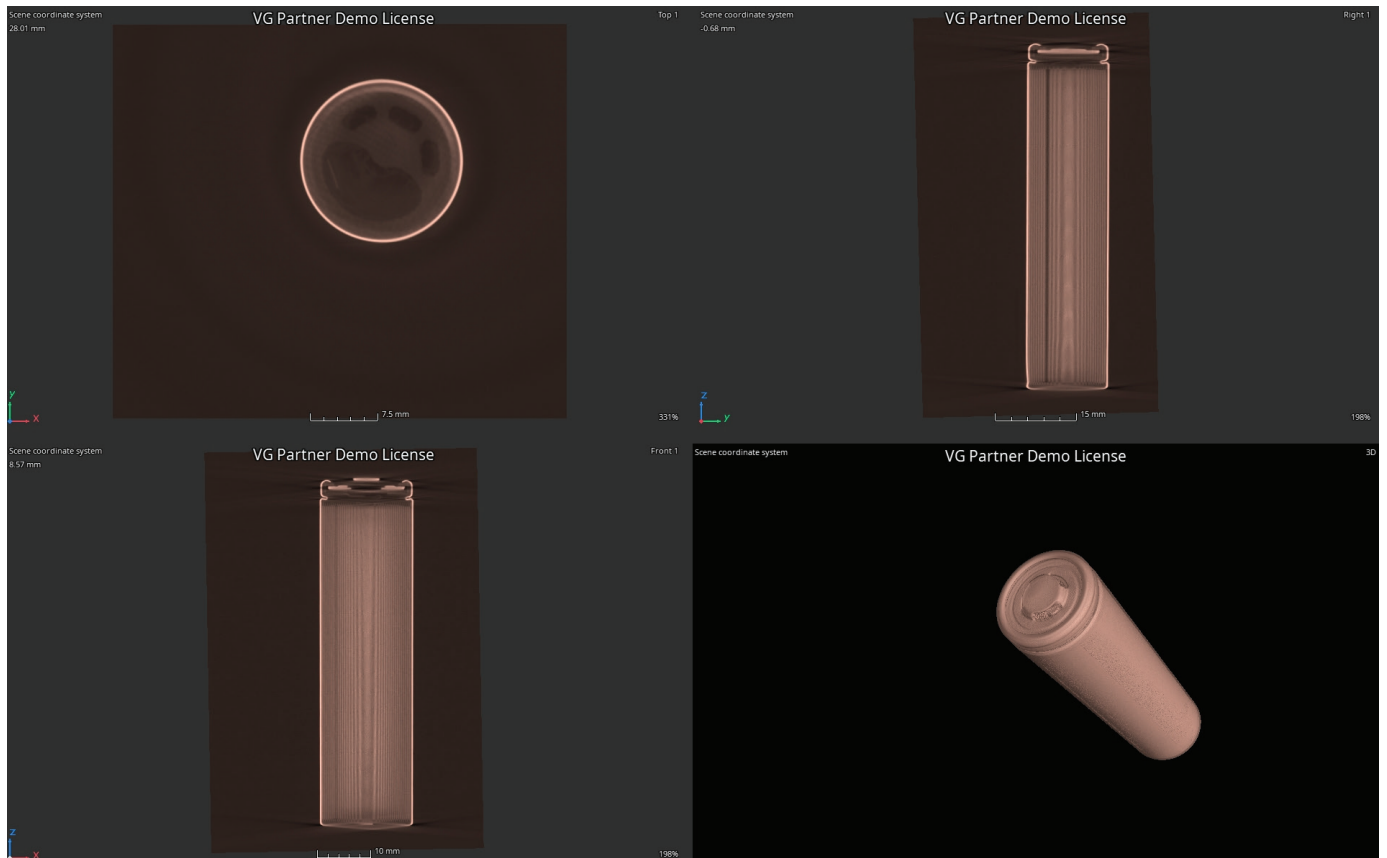


Metrology with Industrial CT

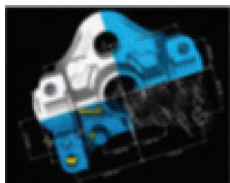
The metrology software from Volume Graphics and MQS Industrial CT systems gives you maximum accuracy and an efficient workflow.

- ▶ Full-featured - VGMETROLOGY offers you the full metrology-related functionality of VGSTUDIO MAX including GD&T functionality.
- ▶ Uncompromisingly accurate – VGMETROLOGY gives you the complete picture of all object surfaces and saves it in the very compact .mvgl format.
- ▶ Universal - VGMETROLOGY works natively on voxel, point cloud, mesh, and CAD data.
- ▶ Easy to use - The focused range of functionality makes VGMETROLOGY easily accessible for new users.
- ▶ Efficient - Powerful automation functions speed up your work when dealing with repetitive tasks and analyzing periodic structures.
- ▶ Seamless - You can exchange files between VGMETROLOGY and other Volume Graphics products.
- ▶ The Universal Metrology Solution - VGMETROLOGY is made for metrologists. Our universal metrology solution turns your computed tomography scanner into a comprehensive and precise metrology device.

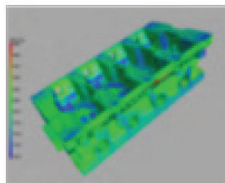




Modules Available



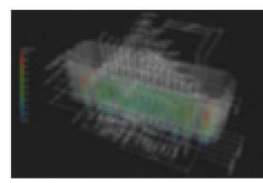
Coordinate
Measurement



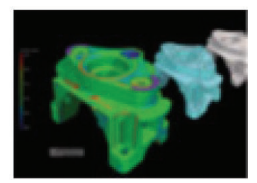
Manufacturing
Geometry Correction



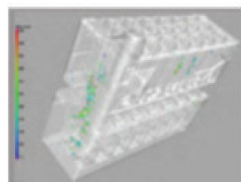
Wall Thickness
Analysis



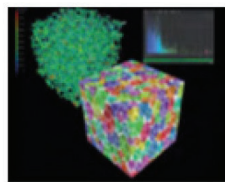
CAD-Import
for PMI



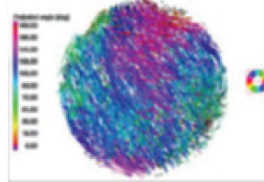
Nominal Actual
Comparison



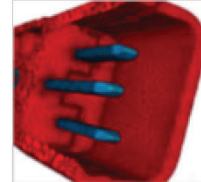
Porosity/ Inclusion
Analysis



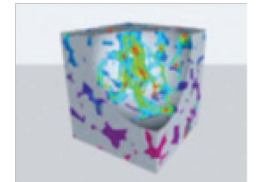
Foam/ Powder
Analysis



Fibre Composite
Material Analysis



Volume
Meshing



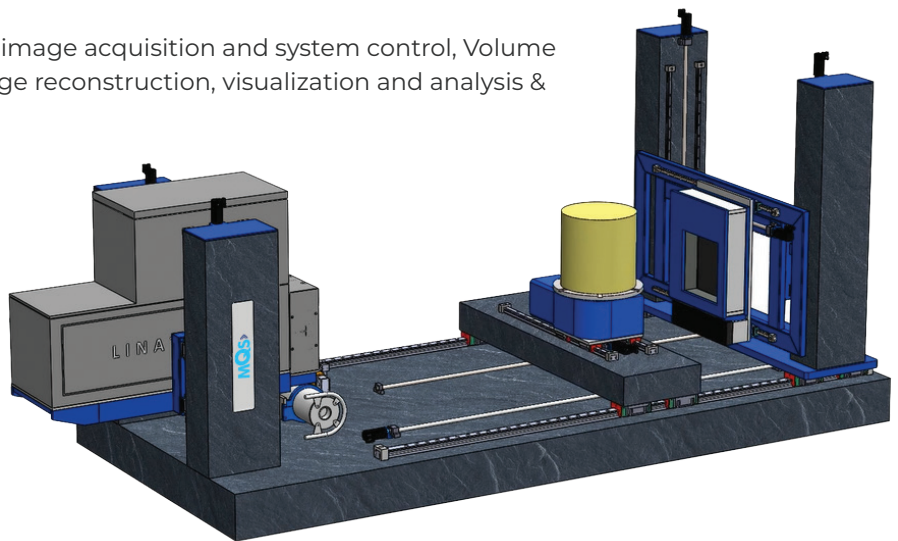
Transport
Phenomena

High Energy CT Inspection Solutions

Some specialized applications require higher power to resolve detail through highly dense materials such as thick-walled metals and heavy polymers. This is when you can choose from a varied range of High Energy X-Ray CT systems from 1MeV to 15MeV with Digital flat panel detectors and line detectors.

Introducing MQHCT Series High Energy 5/ 9MeV CT system consisting

- ▶ Dual Energy 5 / 9MeV Linatron M9A with focal spot 0.8 / 1.5 / 2mm (With difference of dose).
- ▶ Flat Panel Detector, Model PaxScan 4343 HE with 139 Micron resolution with active area of 427x427mm.
- ▶ Line Detector suitable for High energy application.
- ▶ A multi-axis handling system for tube manipulator, DFPD manipulator & object manipulator.
- ▶ System command and control unit and Operator workstation.
- ▶ Image visualization workstation.
- ▶ MIS – Medequip Imaging Software for image acquisition and system control, Volume Graphics make VG Studio Max for image reconstruction, visualization and analysis & Varex CBCT Tools for image.



Our Strengths

- ▶ Multi-disciplinary in-house expertise: (Design, Assembly, Integration & Testing) – Electronics, Instrumentation, Electrical, Imaging, Embedded & LabVIEW Applications, and Mechanical/ Mechatronics
- ▶ Cost competitive – Localized sourcing and manufacturing
- ▶ Partnering with International OEM's (Global market leaders) for operations in India
- ▶ Tailor-made solutions to perfectly match end-to-end CT requirements

KEY ELEMENTS

- ▶ Parallel CT reconstruction and evaluation
- ▶ **Detectability:** Up to 0.5µm in one direction

APPLICATIONS

- ▶ Aluminum, steel, and composite components
- ▶ Additive manufacturing components
- ▶ Aerospace components
- ▶ Li-ion batteries inspections
- ▶ Injection moulding components
- ▶ Industrial and Scientific applications

YOU CAN ALSO BUY

Cone Beam CT Software Tools, a software library, which implements Cone Beam CT, including image enhancement algorithm, lag correction, and beam hardening correction.

Our Clients



About MQS Technologies

MQS Technologies (formerly MedeQuip Services) is a diversified firm with Design, manufacturing & maintenance capabilities that offers custom solutions for engineering & healthcare applications.

Focused on three business lines - Non-Destructive Testing, Aerospace & Defense and Healthcare, our USP lies in leveraging decades of multidisciplinary expertise in electronics, electro-mechanical, mechanical and software domains, to provide user-friendly products and services for a wide range of industries.



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MQS TECHNOLOGIES
formerly **MEDEQUIP**

