CMM LASER SCANNING

HANDHELD LASER SCANNING

ROBOTIZED LASER SCANNING

X-RAY AND CT INSPECTION

LARGE SCALE METROLOGY

CNC AND PORTABLE CMMS

METROLOGY SOFTWARE

METROLOGY SERVICES
XC65D Digital Cross Scanner
The ultimate scanner for feature inspection and more ...
Digital Inspection Process

- Focus point cloud processing
- LC-series CMM-based line scanners
- XC-series multi-line Cross Scanner
- ModelMaker handheld scanner
- K-Scan MMD walk-around scanner

X-ray and CT Insight

- XT V-series electronics X-ray inspection
- XT H-series industrial Computed Tomography systems

Metrology Assisted Production

- Laser Radar large volume inspection
- iGPS large volume tracking and positioning
- iSpace large volume metrology and tool positioning
- Integration Services & Technologies
- Adaptive Robot Control
- RCA – Robot CMM Arm
- K-Robot in-line inspection

Traditional Metrology Solutions

- Bridge CMMs
- Horizontal arm CMMs
- Gantry CMMs
- MCA – Manual CMM Arm
- Camio multi-sensor metrology software
- CMM-Manager metrology software

Motion Measurement Solutions

- DMM - Dynamic Motion Measurement
- Robot calibration & testing
- Wheel/EngineTracker

Metris Services and Support
Manufacturing companies implementing a digital development process are more successful in reducing time to market and development costs. As dimensional quality control provides the touch with reality, it is a critical factor throughout the different stages of this digital process.

Metris’ innovations in laser scanning technology and point cloud software are key enablers of the Digital Inspection Process. Compared to executing inspection directly on the physical part, “Digital Inspection” first digitizes the part and subsequently runs inspection on the acquired digital data. As a result, the Digital Inspection Process – from measurement preparation to final report – takes advantage of the typical automation capabilities and flexibility benefits of a digital approach, saving time and money at the end of the day. As the complete digital copy of the test part remains available, full flexibility is offered to run other or more detailed analysis at any time and place.

Gaining a deeper Insight into the Inside is crucial for small and complex components where many critical features cannot be accessed by touch probes nor seen by optical solutions. For these challenging inspection tasks, Metris offers a broad range of X-ray and Computed Tomography solutions that enable non-destructive inspection of a wide range of products, including loaded Printed Circuit Boards, plastic components, castings, innovative materials, medical and consumer goods, and archeological findings.

When it comes to manufacturing larger components, inspecting parts after they have been produced to find out that they need rework is not an option. As these components are often very expensive and produced in small quantities, first-time-right production is the only valid approach. In a Metrology Assisted Production environment, accurate on-line geometry data is fed back into the process to consistently increase the precision and speed of manufacturing operations. Innovative large scale metrology solutions position and track parts while they are being assembled. Alternatively, metrology data can be used to calibrate industrial robots, or drive a closed-loop feedback loop to firmly increase positional robot accuracy. Leading automotive, aerospace and other manufacturing companies rely on Metris’ Metrology Assisted Production solutions to produce higher-quality products and realize production cost and throughput time savings.

Next to the innovative non-contact metrology technologies, Metris offers a broad range of Traditional Metrology Solutions such as CNC and portable CMM. With this complete product and service offering for the micro metrology market, Metris is uniquely positioned to deliver total solutions. This successful strategy turned Metris into a leading metrology player and a one-stop-metrology-shop providing a broad range of fully integrated metrology solutions. In addition, Metris customers benefit from a single after-sales services organization that delivers true economic value.

Metrology innovations, a complete solution portfolio and excellent service are what make Metris unique in the worldwide micro metrology market.
Metris’ laser scanning and point cloud solutions are key enablers of the Digital Inspection Process (DIP). Digital copies of prototypes, components and assemblies feed real-world information into today’s digital design-through-manufacturing process.

POINT CLOUD PROCESSING
CMM LASER SCANNING
HANDHELD LASER SCANNING
Focus point cloud software

Focus Inspection – The reference for point cloud processing

Metris Focus Inspection is today’s reference for point cloud inspection. The software offers stunning performance, an intuitive user-interface, and standard macro functionality to automate the entire inspection process.

Focus Inspection provides feature and full part-to-CAD 3D inspection, starting from point cloud data or meshes from CMM scanners, handheld scanners or Computed Tomography (CT). Focus Inspection visualizes inspection results in easy-to-interpret, interactive graphics and reports.

FEATURES

- Superior point clouding handling
  - Up to 100 million points
  - Powerful and automated feature detection algorithms
- Full inspection toolbox
  - Full part comparison to CAD or STL
  - Complete set of 2D and 3D features
  - GD&T (Geometric Dimensioning & Tolerancing)
  - Wall thickness, flush & gap, and directional comparison
- Flexible reporting and data sharing
- All inspection functions fully automatable
- Dedicated inspection modules such as Turbine Blade Inspection (TBI)

BENEFITS

- High productivity and data processing consistency with minimum effort
- Operator-independent results with accurate feature detection algorithms
- Designed for industrial use by operators and engineers
- Inspection automation without requiring programming skills
- Easy-to-interpret and interactive reporting to facilitate decision making
Focus RE Basics quickly creates CAD surface models from individual point clouds using a straightforward workflow. Reverse engineering is typically used when original CAD data is missing, to create CAD from handmade clay models, to update designs, or as input for rapid prototyping of freeform parts and products.

Focus Scan is the driver software for Metris laser scanner integrations on CMMs. It provides off-line and on-line scanner path definition and acquires and pre-processes the raw point cloud data. The software is fully integrated with Focus Inspection, Reverse Engineering and Automation. Focus Scan’s off-line module enables the user to create, modify and prove out part programs using 3D CAD models, allowing CMMs to be used exclusively for measurement.

Focus RE Basics - Straightforward reverse engineering

Focus Scan – Fast, easy and accurate data capture for CMM laser scanning

In virtual assembly, measured and CAD models are built together to predict mating conflicts...

...are readily compared to CAD in Focus Inspection

Gap & flush analysis

Turbine blade inspection

Geometric dimensioning & tolerancing (GD&T)

Inspection of features in automotive applications...
Equipped with state-of-the-art CMOS technology and powerful on-board data processing, the LC60D scanner more than triples today’s common scan rates. This enables manufacturers to drastically compress the inspection cycle time for freeform parts, or boost the number of features that can be scanned in the same time frame.

To effectively scan surfaces with varying color or high reflectivity, LC60D provides automatic real-time adjustment of sensor settings for each individual point of the laser stripe. LC50C is the ideal scanner for digitizing features and freeform objects with uniform surface properties. And LC15, with its smaller field of view, perfectly suits digitizing small or detailed objects with higher point density and tighter tolerances.

**FEATURES**

- Laser stripe width of 60mm (LC60D), 50mm (LC50C) or 15mm (LC15)
- Accuracy of 8μm (LC15), 15μm (LC60D) and 20μm (LC50C)
- Scanning of 75,000 points/second (LC60D)
- Fully compatible with Renishaw PH10M(Q) and automatic change racks (ACR)
- Data collection over multi-wire is integrated with most CMM brands and types
- Designed for maximum operational stability and robustness and minimum warm-up time

**APPLICATIONS**

- Inspection and reverse engineering of mobile phones, turbine blades, tools, castings, dies, sheet metal parts, plastics, etc.

**RELATED SOLUTIONS**

- Bridge, horizontal arm and gantry CMMs
- Focus point cloud software, Inspection and Reverse Engineering software
- Camio multi-sensor CMM software

**BENEFITS OF CMM-BASED LASER SCANNING**

- Simplified measurement and processing setup
  - Teach scan paths or indicate scan area on CAD
  - Import feature properties and GD&T information directly from CAD
  - Macro functionality for fully automated scanning and inspection
- Reduced measurement time
  - Reduction of probe head movements
  - XC65D(-LS) scanner captures full feature information in one move

*Detailed analysis of mobile phone cover using LC15*
XC65D(-LS) Cross Scanner

Full 3D capture of complex features and surfaces

Incorporating 3 lasers in a cross pattern, the XC65D captures full 3D details of features, edges, pockets, ribs and freeform surfaces in a single scan. By digitizing complex features from 3 sides, the Cross Scanner acquires the full 3D geometry of the features, driving the accurate extraction of positions and dimensions.

The Cross Scanner’s entirely digital operation boosts scanning frequency and drives intelligent laser intensity adaptation to scan any surface without user interaction.

FEATURES

- Cross-pattern of 3 lasers to obtain full 3D view in one scan
- Drastically reduces time-consuming probe head indexing and eliminates C-axis
- Fast digital scanner operation including high-speed CMOS camera technology
- XC65D-LS longer stand-off variant for optimal capture of deep pockets and slots
- Accuracy 15μm (XC65D) and 20μm (XC65D-LS)

APPLICATIONS

- Inspection sheet metal features (slots, holes, etc.)
- Inspection of castings and complex surfaces
- Feature inspection
- Gap & flush inspection

- Unique capability to measure freeform and fragile surfaces
  - Detailed description of freeform surfaces in short time interval
  - Non-contact measurement eliminates the need to touch fragile and delicate parts
  - Powerful reporting with colored CAD deviation maps
  - Input for reverse engineering, rapid prototyping, finite element calculations and digital archiving
The ModelMaker handheld laser scanners are ideally suited for portable 3D inspection and reverse engineering applications. ModelMaker’s true digital camera technology is a major leap forward in 3D laser scanning, as it introduces enhanced sensor performance, high frame rates, and a large stripe width up to 200mm for ultra-productive scanning.

The digital camera benefits from a true non-interpolated resolution of up to 1024 points per stripe, providing optimum resolution for efficient scanning of freeform surfaces and features. ModelMaker is compatible with Metris MCA and many 3rd party articulated arms next to the K-Series optical CMM system.

FEATURES

- Up to 80,000 measurement points per second
- Multiple stripe widths available from 40 to 200mm
- Accuracy down to 16μm (2σ)
- Enhanced Sensor Performance for scanning materials with varying surface materials and reflectivity
- Out-of-the-box scanning with direct plug into PC
- Focus software for handheld 3D laser scanning
  - Real-time rendered scan visualization
  - Localizer-driven scanning menu
  - Mesh creation and processing
  - Part-to-CAD comparison

BENEFITS

- Ergonomic solution thanks to lightweight housing and full scanner control at your fingertips
- Superior scanning accuracy for freeform and feature inspection
- High scanning throughput through fast digital data capture
- Robust design for use under all shopfloor conditions

APPLICATIONS

- Part-to-CAD inspection
- Inspection of geometric features
- Gap & flush inspection
- Reverse engineering – from concept studio clay to class A surfaces
- Input for rapid prototyping

RELATED SOLUTIONS

- MCA articulated measuring arm
- K-Series Optical CMM
- Focus point cloud processing software

MMD scanner is available in 50/100/200 stripe width and scans at max rate of 81,920 points/sec

MMC scanner is available with 40/80/160mm stripe width and scans at 24,000 points/sec

Focus software handles data acquisition and processing
K-Scan MMD is a handheld walk-around laser scanner for portable metrology applications in a large work volume. Continuous and precise probe tracking through the system’s Optical CMM and 20 infrared markers integrated into the laser scanner device eliminate all mechanical constraints for effortless scanning.

Accurate performance and superior ergonomics make K-Scan MMD a very user-friendly handheld scanning solution. K-Scan MMD is the ideal tool for accurate part-to-CAD inspection and productive reverse engineering of large components. Dynamic referencing guarantees consistent measurement results even in case the camera or measurement object moves during scanning.

**FEATURES**
- Measuring volume of 17m³ expandable by adding more cameras
- Stripe width between 50 to 200mm (depending on the selected scanner type)
- Up to 54,000 measurement points per second
- Lightweight carbon fiber probe design
- Dynamic referencing
- SpaceProbe available for tactile measurements

**BENEFITS**
- Measure anywhere
- Effortless handling through probe tracking and ergonomic design
- High scanning throughput and superior accuracy
- Multi-camera setup enlarges work volume to capture complete car or truck

**APPLICATIONS**
- Full surface and feature inspection of larger parts
- Flush & gap inspection
- On-site troubleshooting
- Solving assembly problems

**RELATED SOLUTIONS**
- K-Series Optical CMM
- SpaceProbe
- Focus point cloud processing software
Get the inside picture of complex electronics or industrial parts, by literally looking into the internal structure. Then use CT capability to qualify and quantify any inner or outer dimension, all in a smooth, non-destructive process.

XT V 160 ELECTRONICS X-RAY INSPECTION
XT H 225 INDUSTRIAL CT SCANNING
XT H 450 HIGH POWER COMPUTED TOMOGRAPHY
Fast and accurate inspection of miniaturized electronic components

Component connections on today’s compact and densely populated Printed Circuit Boards (PCB) are hidden by other components making X-ray the only viable inspection solution. XT V 160 is an easy-to-use, cost-effective and high-quality PCB inspection system targeting production facilities and failure analysis laboratories.

In automated inspection mode, samples can be inspected at the highest throughput. In manual mode, intuitive software and high-precision sample manipulation enable operators to visualize and evaluate the smallest internal defects and deficiencies.

**FEATURES**

- NanoTech™ source with submicron focal spot size
- True 75° tilting angle for optimum inspection of BGAs
- Fast data capture and high-quality images
- Large tray for loading multiple boards
- Customizable macros automate measurement workflow

**BENEFITS**

- Flexibility combined in one system
  - Interactive visualization
  - Fully automatic X-ray inspection
  - Optional CT for in-depth analysis
- Maximum magnification at unrivalled angles
- Fast operation with interactive joystick navigation
- Low-cost maintenance with open-tube technology
- Safe system does not require special precautions or badges
- Small footprint and low weight for easy installation

**APPLICATIONS**

- Solder reflow analysis
- BGA connectivity and analysis
- Solder void calculation
- Through hole measurement and inspection
- Die attach voiding measurement
- Ball bond analysis
- Stitch bond analysis
- Micro BGA / chip on chop analysis
- Pad array analysis
- Dry joint detection and analysis

**RELATED SOLUTIONS**

- XT V 100 and XT V 160T

Under any combination of rotation, tilt and magnification, the region of interest is consistently locked into the center of the field of view.

Detailed ball grid array (BGA) and wire bond verification
Full inner and outer inspection of industrial components

Detailed capture and measurement of internal component and assembly features is often vital for quality control, failure analysis and material research. XT H 225 offers a powerful micro-focus X-ray source, a large inspection volume, and high X-ray and CT imaging resolution. XT H 225 is available with optional rotating target and suits a wide range of applications, including inspection of small castings, plastic parts as well as material research.

APPLICATIONS

- Evaluation and measurement of precision plastic parts and small castings, complex mechanisms, internal components, part-to-CAD comparison, etc.
- Detailed failure analysis
- Advanced material research and analysis of biological structures
- Digital archiving of models
- Troubleshooting of assembly issues

RELATED SOLUTIONS

- XT H LC (Large Cabinet)
- Focus Inspection software
- Metris can provide a wide range of customer-specific CT configurations

FEATURES

- Powerful 225kV micro-focus source with Rotating Target option
- Real-time X-ray visualization, fast CT reconstruction
- CT measuring volume up to 250mm and 600mm height
- 5-axis fully programmable part manipulator
- Customizable macros automate measurement workflow
- Small footprint and low weight for easy installation

BENEFITS

- Flexibility combined in a single system: X-ray for quick visual inspection, CT for in-depth analysis
- Fast data capture and high-quality images
- Fast operation with interactive joystick navigation
- High-resolution digital imaging and processing
- Embedded safety enables to operate system without any special precautions or badges
- Tight integration with industry standard post-processing applications

Part-to-CAD analysis  Dimensioning  Spurs of gold in Calcite

Cylinders fitted in holes  CT of foam structure  Snail fossil with offspring

An X-ray source with rotating target boosts X-ray flux by up to 5 times, enabling customers to obtain faster CT data acquisition or achieve higher CT data accuracy in the same time span.
High power 450kV micro-focus source

The Metris XT H 450 LC sets a new reference for turbine blade measurement and NDT of small to medium castings. At the core of this powerful equipment is a 450kV micro-focus source, providing superior resolution and accuracy.

The curved linear array detector optimizes the collection of X-rays by eliminating scatter phenomena that typically corrupt 2D radiographs of blades and other metal parts.

**FEATURES**
- Unique 450kV micro-focus source
- Measuring volume up to 600mm diameter and 600mm height
- High efficiency linear detector 5-axis fully programmable tray manipulator with precision ball screws and linear slides
- Dedicated application for automatic pass/fail inspection of turbine blades

**BENEFITS**
- Flexibility combined in a single system: X-ray for quick visual inspection, CT for in-depth analysis
- Fast data capture and high-quality images
- High-resolution digital imaging and processing
- Embedded safety enables to operate system without any special precautions or badges

**APPLICATIONS**
- Detailed analysis of the internal structure of turbine blades
- Automated pass/fail inspection of blades
- Inspection of high density parts (e.g. metal parts, castings) with a need for micron accuracy

**RELATED SOLUTIONS**
- Metris can provide a wide range of customer specific CT configurations

![X-ray inspection of turbine blade](image1)
![CT volume model of turbine blade](image2)
![X-ray of chainsaw](image3)
![X-ray of engine casting](image4)
![CT volume model of engine casting](image5)
Metrology Assisted Production

Metris assists customers in successfully deploying metrology-driven manufacturing capability. Metrology assisted production builds on accurate geometric data to consistently increase the precision and speed of design, manufacturing and assembly operations.

LARGE SCALE METROLOGY

METROLOGY INTEGRATION SERVICES

ROBOT BASED METROLOGY
Manufacturers of large structures face several inspection challenges: collect high accuracy data on the shop floor in a large measurement volume, while speeding up measurement and reducing labour expenses. Laser Radar provides fully automated, non-contact metrology capability for large volume applications spanning up to 60 meters. It reduces operator overhead, eliminates the need for photogrammetry dots and retroreflectors, and is able to measure difficult-to-reach positions.

Besides extensive use on wings, fuselages and other aerospace components and assemblies, Laser Radar serves a variety of applications across markets.

**APPLICATIONS**
- Measurement and alignment of large metal, composite parts
- Certification of tooling
- Production repeatability monitoring
- Alignment of aircraft components before assembly
- Automated inspection of riveting hole positions
- Check dimensions of forged and molded parts before starting expensive and time consuming milling process
- On-machine verification of large machined parts
- Gap & step measurements of jet engine cowlings
- Mold and first article inspection of composite components
- Inspection of antennae, solar panels, wind turbine blades
- Suited for both in-line and bypass inspection

**FEATURES**
- Measurement distances up to 24m or 60m
- Accuracy from 16μm (1m distance) to 241μm (24m distance)
- Use of mirrors to measure hard-to-access surfaces
- Single contiguous coordinate system avoids re-assembly of point clouds
- Fast automated measurement of tooling ball centers

**BENEFITS**
- Automated inspection for large objects
- Non-contact measurement for fragile parts or parts that are difficult to access
- No need for targets, spherical mirror reflectors (SMR) or retroreflectors
- Measures smaller part details than possible with SMR
- Single-operator setup and operation

**RELATED SOLUTIONS**
- iGPS and iSpace
- Integration Services & Technologies

Laser Radar also proofs its use in new energy market where it measures large and delicate structures such as solar panels and wind turbine blades. 
iGPS is a modular large scale metrology solution that transforms large fabrication facilities into accurate metrology-enabled areas. Within the facility, an unlimited number of handheld measurement probes or tracking sensors (fixed on tools and components) can operate in concurrent mode.

Unique iGPS capabilities in terms of scalability, robustness and number of parallel users provide quick return on investment and a solution that grows along with expanding manufacturing operations.

**FEATURES**
- Expand measurement volume by extending transmitter network
- 200μm accuracy
- Continuous health monitoring
- Transmitter redundancy
- Unlimited number of users and applications possible within iGPS-enabled working volume.
- Multiple devices can be equipped with iGPS receivers for accurate positioning

**BENEFITS**
- Supports factory-wide deployment
- Uniform accuracy throughout the entire workspace
- Scalable, accurate and robust solution
- Measure anywhere within metrology-enabled area
- Concurrent use of unlimited number of handheld probes and tracking sensors

**APPLICATIONS**
- Large scale positioning and tracking suited for aerospace, shipbuilding, train, etc.
- Part joining and assembly
- Tracking of parts, tools and automatically guided vehicles
- Dynamic tracking of ship models in water tanks
- Tracking of robot positions

**RELATED SOLUTIONS**
- iSpace
- Integration Services & Technologies

**Large shipbuilding companies deploy iGPS to monitor production and assembly of large ship parts**

**A single iGPS installation monitors the motion of multiple industrial robots**
**APPLICATIONS**

- Handheld large volume inspection in automotive (engineering lab, racing workshop), aerospace and other industries like casting and turbine blade production.
- Automatic annotation of handheld NDT measurements with positional information.

**RELATED SOLUTIONS**

- iGPS
- iProbe - 6DOF tactile measurement probe
- iMCA - iSpace enabled articulated arm

Metris iSpace activates a large scale metrology workspace, in which objects can be measured and tracked accurately. iSpace tracks multiple measuring devices – handheld probes, articulated arms and laser radars – that can be operated concurrently.

Predefined configuration packages allow iSpace systems to be easily installed at economies never achievable in the past. Accurate and continuous system monitoring – guarantees robust, efficient and reliable iSpace operation.

**FEATURES**

- Measurement volumes ranging from 400 to 1200m³
- Dynamic positioning of handheld probes, articulated arms and laser radars
- Point measurement accuracy down to 200μm

**BENEFITS**

- Dynamic positioning of handheld probes, articulated arms and other measurement equipment
- Uniform accuracy throughout the entire workspace
- Scalable, accurate, robust and multi-user solution
- Quick setup and easily deployable

Using iProbe the operator can freely walk around and perform measurements in a large volume

iMCA provides freedom for articulated arm measurements
Experienced team – Advanced technology – Proven solutions

By tightly integrating metrology into the production process, manufacturing tasks will consistently occur at higher precision, resulting in better product quality and increased manufacturing flexibility. Metrology assisted production sequentially leads to substantial production cost and throughput time savings.

Metris Integration Services & Technologies is the ideal partner in successfully deploying metrology enabled manufacturing solutions, from the conceptual design stage to final commissioning.

FEATURES

- Experienced team
  - Wide-ranging knowledge of global manufacturing technologies
  - Specialized in large scale aerospace manufacturing and assembly
  - Customer project management from conceptual design through final commissioning
- Use of advanced metrology technology
  - Metris products (Laser Radar, iGPS, Optical CMM)
  - Other commercial available metrology solutions
- Proven solutions at renowned customer sites

APPLICATIONS

- Metrology-guided assembly of major structures
- Intelligent laser-guided assembly
- In-process quality control inspection cells
- Laser-guided ultrasonic thickness inspection
- Automated laser-assisted wire harness fabrication
- Laser-assisted flexible tooling assembly
- Damage assessment & field correction systems

RELATED SOLUTIONS

- iGPS
- Laser Radar
- Adaptive Robot Control

BENEFITS

- (Semi-)automate manual assembly or inspection processes
- Accurate & real-time tracking and alignment of tools and parts
- Workcell management toolkit designed to simplify, automate and error-proof manufacturing processes
- Reduce manufacturing time

Integration Services & Technologies teams design and install customized turn-key solutions that increase process accuracy and efficiency
Adaptive Robot Control

Accurate robot positioning in any circumstances

Adaptive Robot Control activates a closed metrology-driven feedback loop that firmly increases the precision of industrial robots. Regardless whether robots are deployed for machining, inspection, applying beads or manipulating objects, roboting tasks are consequently executed with 0.1mm absolute accuracy, irrespective of degrading phenomena like play, mechanical flexibility, backlash or thermal effects.

FEATURES

- Dynamic tracking and closed feedback loop to robot controller
- Tracking volume of 17m³ (expandable)
- Tracking sample rate up to 1000Hz
- Simultaneous measurement of up to 1024 points
- Accuracy down to 0.1mm in the entire working volume of the robot

BENEFITS

- Independent metrology chain for industrial robot applications
- Providing high level of absolute robot accuracy
- Portable and scalable solution
- Investment is only a fraction of new product equipment with comparable accuracy

APPLICATIONS

- Accurate drilling and riveting on wings and fuselages where the motion of the part is monitored
- Robot machining (drilling/fettling/milling) where the motion of the tool is monitored
- High-precision placement of objects or tools
- Accurate material depositing (sealant, tape layering, etc.)

RELATED SOLUTIONS

- K-Series Optical CMM
- Robot calibration & testing
- Integrated Services & Technologies
RCA combines the best of two worlds by offering the automation capability of a traditional CMM and the mobility and part accessibility of an articulated arm. To accelerate repetitive 3D inspection, RCA interfaces a highly accurate internal 7-axis articulated arm with an external skeleton driven by electric motors.

This unique concept creates an in-line inspection robot that drives a 3D laser scanner along the programmed motion path. The capability to access inner cavity locations of specimens, such as vehicle body shells, is a major leap forward compared to traditional CMMs and even articulated arms.

**FEATURES**
- Inspection volume up to 4.2m diameter
- Optimal scanning through continuous adaptation of scanner orientation
- Excellent material scanning and fast data acquisition
- Handheld control panel runs on Camio software
- Internal metrology arm
  - Premium encoder technology
  - Stiff carbon fiber axes
- Operating temperature range from 0 to +45°C (32 to 113°F)
- Integrated controller
- Off-line programming from CAD

**BENEFITS**
- Robotized laser scanning for fast part-to-CAD inspection
- Absolute measurement accuracy
- Full access to inner cavity locations of body shells and other specimens
- Docking stations facilitate fast and repeatable RCA installation

**APPLICATIONS**
- In-line or next-to-line sheet metal inspection
- Feature and surface inspection
- Full part-to-CAD inspection
- Flush & gap inspection
- Repetitive on-site inspection of castings and machined aerospace parts
- Troubleshoot production issues by having RCA temporarily inspect production samples

**RELATED SOLUTIONS**
- Laser scanners
- Camio multi-sensor metrology software

Extreme accessibility and powerful automation capabilities are RCA’s major strengths.
K-Robot

In-line robotized scanning and inspection

K-Robot is a flexible, productive and accurate metrology solution for in-production-line inspection using an industrial robot. The Optical CMM dynamically tracks the location of K-Robot’s ModelMaker laser scanner while the robot is running an automatic scanning job. High scanning accuracy is guaranteed, as proven metrology components of K-Robot obsolete cyclic robot calibration and eliminate the influence of robot warm-up, drift and backlash.

FEATURES
- Global absolute accuracy: better than 100μm in entire work volume
- Robust against ambient light conditions
- Inspection results in MS Excel and SPC-compatible formats
- Automatic rapid digitizing for part-to-CAD inspection or adaptive machining
- Excellent material scanning and fast data acquisition
- Operating temperature range from +15 to +35°C (59 - 95°F)

BENEFITS
- Truly absolute measurement accuracy
- Eliminates effects of robot warm-up, drift and backlash
- Interfaces to any robot brand, size and accuracy level
- High scanning accuracy and throughput
- Off-line teaching and programming

APPLICATIONS
- Feature and surface inspection
- Gap & flush
- Sheet metal and body-in-white as well as forged or molded parts
- Partial in-line inspection of the entire production volume
- Complete bypass inspection of production samples

RELATED SOLUTIONS
- ModelMaker laser scanners
- K-Series Optical CMM
- Adaptive Robot Control

K-Robot’s independent metrology chain and closed feedback loop guarantee high scanning accuracy

Fast repetitive laser scanning for in-production-line inspection
BRIDGE, HORIZONTAL ARM, GANTRY CMM PORTFOLIO

ARTICULATED MEASURING ARMS

MULTI-SENSOR CMM SOFTWARE

TACTILE SOFTWARE FOR CNC, MANUAL AND PORTABLE CMMs

A complete portfolio of CMMs and articulated arms
High-performance ceramic and aluminum bridge CMMs

LK’s ceramic bridge and spindle components coupled with proven air-bearing design provide the ultimate in stiffness and stability, altogether delivering significantly improved repeatability.

With super-light aluminum as a key structural component and air bearings on all axes, C3 bridge CMMs are high-specification and cost-effective metrology solutions for small to medium size applications.

FEATURES

- Standard volume ranges
  - LK from 800x700x600 to 6000x2500x2000mm
  - LK V-SL from from 800x700x600 to 2500x2000x1500mm
  - C3 from 500x400x400 to 3300x2000x1500mm
- Flexible multi-sensor platform: touch probes, analog scanning, laser scanning
- High capacity (loads) table
- LK V-SL performance
  - Repeatability up to 0.7μm
  - Velocity up to 51 m/min
  - Volumetric accuracy equals 1.1μm + L/400mm

BENEFITS

- Premium performance
- High velocities/accelerations for low cycle times
- Excellent accuracy and repeatability
- Total solution for digital inspection

APPLICATIONS

- Machined and pressed parts
- Plastic moldings
- Casting and forgings
- Touch trigger and non-contact inspection
- Digitizing, scanning and reverse engineering

RELATED SOLUTIONS

- CMM laser scanners
- Camio multi-sensor metrology software

LK V-SL features a revolutionary design that delivers with sub-micron accuracy the ultimate scanning and inspection performance.

C3 bridge CMMs are high-specification, cost-effective metrology solutions.
Horizontal arm CMM

The fastest high accuracy horizontal arm CMMs on the market

Metris complete range of horizontal arm CMMs provides unequalled performance in speed, accuracy and repeatability.

Ceramic guideways and air bearings used in the construction of LK H CMMs, offer stability at high velocity and acceleration. LK horizontal arm CMMs provide unique access to the measuring envelope and can be supplied as subfloor or floor level installations, or as part of fully-automated measurement cells.

With super-light aluminum as a key structural component and air bearings on all axes, C3 horizontal arm CMMs are high-specification and cost-effective metrology solutions.

APPLICATIONS

- Automotive full body and panels inspection
- Inspection of large parts such as mold tools, housings, castings, etc
- Integrated in-line inspection
- Touch trigger and non-contact inspection
- Digitizing, scanning and reverse engineering

RELATED SOLUTIONS

- CMM laser scanners
- Camio multi-sensor metrology software

FEATURES

- Multiple CMM configurations available: table, rail, twin, etc.
- Standard volume ranges
  - LK H-T (Table variant) from 1000x400x600 to 5000x1600x2000mm
  - LK H-R (Rail variant) from 4500x1600x2000 to 10000x1600x3000mm
  - C3: from 2000x1000x1200 to 6000x1600x2500mm
- Supports laser scanners and touch sensors

BENEFITS

- Premium performance
- High velocities/acceleration for low cycle times
- Excellent accuracy and repeatability
- Flexible multi-sensor platform: touch probes, analog scanning, laser scanning
- High-capacity (loads) table
Gantry CMM

A new breed of large scale CMMs

Metris offers truly flexible and reliable gantry CMMs when size really matters. In addition to high accuracy with maximum volume, gantry CMMs support a variety of probing solutions, including touch-trigger digital, analogue and laser options. Metris also provides customized gantry CMM projects that meet customers’ exacting requirements.

LK gantry CMMs are constructed of materials with high thermal stability to guarantee optimum accuracy.

With the option of aluminum or steel structural components, C3 gantry CMMs are affordable large scale metrology solutions offering all the benefits of high throughput for the inspection of very large components.

**FEATURES**

- Standard volume ranges
  - LK V-G from 3000x3000x2500 to 16000x5000x4000
  - C3 V-G from 2500x1500x1000 to 12000x3500x2500mm
- High-performance air bearings
- Supports tactile styli and laser scanners
- Use of materials with high thermal stability and optimized dimensional characteristics
- LK CMMs feature granite rails with ceramic Y and Z guideways
- C3 CMMs feature aluminum or steel guideways

**BENEFITS**

- Elevated guideway combines high accuracy with maximum volume
- Optimized guideway design requires less compensation
- Superior reliability and performance
- Multi-sensor support
- Integration pallet transfer systems

**APPLICATIONS**

- Automotive and commercial vehicles
- Aerospace components and structures
- Marine and locomotive engine components
- Telecommunications and satellite equipment
- Printing equipment

**RELATED SOLUTIONS**

- CMM laser scanners
- Camio multi-sensor metrology software

**CERAMICS FOR LK PREMIUM PERFORMANCE**

Stress-free ceramic guideways are most dimensionally stable, provide high and long-lasting measurement accuracy, and require minimum machine verification, saving both time and money.
Metris MCA is a precise, reliable and comfortable portable measuring system that can be equipped with a wide range of probing. Operated wirelessly and battery powered, it feels perfectly at home in the metrology lab, on the shopfloor and in the field.

MCA comes in different sizes and in two accuracy variants. The 6-axis version ideally suited for touch trigger measurement while combined with a ModelMaker scanner, the 7-axis MCA is the perfect partner for a wide range of digital scanning tasks.

**FEATURES**

- 6- and 7-axis versions in two variants
  - Industry variant for quick verification
  - Metrology variant for high accuracy inspection
- Lightweight carbon fiber and aluminum alloy components
- Wireless data communication for scanning and touch probe measurements
- Battery operation provides hours of measurement autonomy
- New encoder technology ensures optimum measurement accuracy
- Electromagnetic brake blocks lower arm segment for effortless measurements

**BENEFITS**

- Scan and go! - Easy and fully integrated solution for articulated arm scanning
- True portability enables to measure anywhere
- Ergonomic design increases operator productivity

**APPLICATIONS**

- Full part-to-CAD inspection
- Feature inspection
- Flush & gap inspection
- On-site troubleshooting
- Solving assembly problems
- Data collection for reverse engineering
- Tube measurements

**RELATED SOLUTIONS**

- ModelMaker laser scanners
- MCA floating touch probe
- Focus software

MCA comes in 6- or 7-axis versions for touch trigger or laser scanner measurement. MCA can be equipped with laser forks for tube bending measurements.
Camio multi-sensor metrology software

The benchmark for efficient multi-sensor CMM operation

Camio is a fully integrated multi-sensor software platform for off-line programming and on-line inspection. It redefines the world of CMM measurement, featuring powerful tools that efficiently drive laser scanners as well as a wide variety of touch sensors.

User-friendly programming techniques as well as drag-and-drop and wizard-based functionality provide new and experienced users all efficient means to create DMIS CMM inspection programming from CAD product model data.

FEATURES

- Integrated solution for on-line and off-line programming
- Full and exact compliance to the DMIS standard
- Support of wide range of CAD file formats: CATIA® v4 & v5, Pro/E®, UG®, Parasolid®, HOOPS®, STEP® and IGES®
- Multi-sensor programming and simulation
- Powerful laser scanning feature inspection

BENEFITS

- Support 3rd party CMM through I++ interface
- Switch between touch trigger probing, analog or laser scanning with minimum program modifications
- Access to GD&T data from leading CAD software packages
- Production mode operation, reducing cycle time up to 25%

APPLICATIONS

- Automotive sheet metal and powertrain
- Aerospace airframe and components
- General precision engineering
- Reverse engineering
- Medical manufacturing

RELATED SOLUTIONS

- Bridge, horizontal arm and gantry CMMs
- RCA Robot CMM Arm
CMM-Manager metrology software

A full-featured metrology software for manual, CNC and portable CMMs

CMM-Manager is a task-oriented, highly intuitive software for tactile measurements using manual, CNC and portable CMMs. It is a fully integrated CMM measurement environment featuring walk-in quick-measure, one-click CAD-measure, collision-free CAD-teach, virtual simulation, real-time verification, CAD and datum alignment, and many more smart functions.

Large intuitive icons and measurement guidance for operator make CMM-Manager a highly intuitive, easy-to-use metrology software for portable inspection tasks on the shopfloor, in the lab as well as in the field.

**BENEFITS**
- Focus on quick and accurate measurement results
- Easy to use, yet very complete metrology software
- Single software package for CNC, manual and portable measurement

**FEATURES**
- CAD based graphical programming
- Automatic collision detection
- Smart alignment features
- Automatic probe recognition
- Leap frogging to extend measurement volume for portable measurement
- Drag and Drop web-ready graphical reporting

**RETROFIT CAPABILITIES**
- CNC or Manual CMM: Metris CMM, Sheffield Cordax, Brown & Sharpe, Mitutoyo, Zeiss, Starrett, Renishaw UCC1/UCC2 controller
- Portable CMM retrofits: Metris MCA, MicroscribeX, Faro, CimCore/Romer, K-Series Optical CMM

*Easy-to-use software capable of measuring complex parts*
*Quick data interpretation through color-coded local geometry deviation*
*K-Series Optical CMM with SpaceProbe for large volume measurements*
Metrxis provides solutions for non-contact industrial motion and displacement measurement based on the Optical CMM technology.

DMM - DYNAMIC MOTION MEASUREMENT

ROBOT CALIBRATION & TESTING

WHEEL/ENGINETRACKER
**DMM - Dynamic Motion Measurement**

Optical motion measurement

DMM is the perfect tool for motion and deformation measurement and evaluation by accurately measuring the individual LED point coordinates. It is a digital metrology system that accurately measures the dynamic evolution of point coordinates. DMM’s Optical CMM measures displacements and deformations of points and objects at high accuracies and sampling rates, providing detailed insight into motion characteristics and space envelopes.

**FEATURES**
- Tracking volume of 17m³ (expandable)
- Tracking sample rate up to 1000Hz
- Simultaneous measurement of up to 1024 marker points

**BENEFITS**
- Measurement of dynamic and quasi-static motion
- High accuracies and sampling rates
- Direct data streaming to third party systems
- Portable and scalable solution
- Easy setup and standalone operation

**APPLICATIONS**
- Door and roof closure testing
- Suspension degradation testing
- Body component vibration testing
- Motion/deformation verification of fuselage, wing, flaps, slats, landing gear and doors
- Real-time tracking of 6-DOF actuators
- Thermal deformation testing
- Ship scale model motion tracking in towing tank

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**Robot calibration & testing**

Providing absolute robot accuracy in industrial environments

Besides tracking scanners (K-Scan MMD and K-Robot), the K-Series Optical CMM can be deployed to calibrate industrial robots. In combination with the robot calibration software ROCAL, a robot signature is generated that takes into account all identified kinematic and flexibility parameters, leading to unmatched absolute accuracies across the entire working volume of the robot.

**APPLICATIONS**
- Increasing accuracy of industrial robots in various manufacturing industries
- Robot calibration & testing applies to most types of industrial robots

**FEATURES**
- Tracking volume of 17m³
- Accuracy down to 400μm in the entire working volume of the robot.
- Optimize specific applications using Metris Roboscope™, the digital oscilloscope for robot motion

**BENEFITS**
- Providing high level of absolute robot accuracy
- Portable and scalable solution
- Off-line calibration & testing avoids reteaching robot programs on-site

**RELATED SOLUTIONS**
- Adaptive Robot Control
- K-Series Optical CMM
WheelTracker is an optical contactless wheel and engine motion measurement system. It measures up to four wheels and offers an optional camera for engine motion measurement. WheelTracker operates on all road conditions in all weather conditions, and streams the data directly into a data acquisition system or laptop.

**FEATURES**
- Full 6-DOF motion measurement
- Non-contact optical measurement
- Low mass added to wheels
- All-weather proof
- Accuracy down to 80μm

**BENEFITS**
- Synchronized measurement of 4 wheels and engine
- Compact and quick setup
- High dynamic accuracy

**APPLICATIONS**
- Dynamic kinematics and compliance (K&C) evaluation
- Toe and camber evolution during maneuvers
- Lap recording for road simulators on test and race tracks
- Wheel and engine packaging testing
- Full-speed performance tests
- Emergency stop and ABS testing
- Vehicle dynamics tests (bump steer, roll steer, dive, etc.)
- Ride and handling evaluation

**RELATED SOLUTIONS**
- K-Series Optical CMM

WheelTracker EngineTracker Slalom test for wheel behavior analysis
Metris provides ISO9001/2000 and UKAS accredited metrology solutions to a wide range of industries and bluechip customers in a global marketplace, utilizing a worldwide network of highly trained metrology experts. The complete range of services including helpdesk support, training, maintenance programs, retrofit capabilities and contract work, enables our customers to get the maximum value out of their Metris solutions or to solve their inspection issues in the shortest time.

**HELPDESK**
Instant help – the skills and technical knowledge to solve your application/software problems by dedicated helpdesk engineers.

**METROLOGY TRAINING/SEMINARS**
Knowledge base – on site/off site, basic, intermediate and advanced software and hardware training and seminars using dedicated staff with hands-on experience.

**PROGRAMMING CONSULTATION**
Operational assistance - highly-skilled engineers provide part programs or programming consultation - expertise which can reduce your product inspection costs.

**MAINTENANCE AND CALIBRATION**
Technical service – the manpower, state-of-the-art technology and logistics to maximize reliability, uptime and equipment performance.

**SUB-CONTRACT INSPECTION**
Metris offers a wide range of sub-contract inspection work. The broad product portfolio includes the right tool for every inspection challenge of the customer. On top of Metris own inspection service facilities, Metris also has a broad worldwide network of Metris Service Centers, that are accredited by Metris to perform contract inspection work.

- UKAS accredited CMM sub-micron, temperature-controlled inspection with the capability to measure all component types and sizes.
- Laser scanning work for part-to-CAD inspection or Reverse Engineering
- X-ray and CT inspection work for electronics, industrial applications

**UPGRADE AND RETROFITS**
Existing CMMs often see an improvement in performance, life expectancy, and accuracy with the retrofit of an advanced Metris CMM controller, powerful DMIS-compliant Camio Studio or CMM-Manager software or an innovative Metris scanner. A full range of hardware upgrades and retrofits is available to meet all of your current and future needs.

**SOFTWARE UPGRADES**
The rapid development of CMM metrology software means CMMs may well be operating with outdated software, whether supplied by Metris or as part of your existing CMM system. Metris retrofits your CMM with the latest, easy-to-use Camio or CMM-Manager 3D metrology software, either through Metris-Controller technology, proprietary protocol support or via the I++ DME open protocol standard. Whether you use manual or CNC CMMs, Metris has an extensive range of software products designed to support your programming and reporting applications.
REQUEST FOR INFORMATION

Yes, I would like to receive specific information regarding Metris and its products and applications

1. Tick the products and applications of your interest

☐ Coordinate Measuring Machines (CMMs)
☐ Articulated measuring arms
☐ CMM laser scanners
☐ Handheld laser scanners
☐ RCA - Robot CMM Arm
☐ X-ray and Computed Tomography
☐ Laser Radar for large volume metrology
☐ iGPS / iSpace for large scale tracking and positioning
☐ Dynamic measurement (DMM and Wheel/EngineTracker)
☐ CMM retrofits
☐ Service work / Integration services/ Training

2. Tick the items you would like to receive

☐ Metris Demo CD including company brochures, product information, movies and case studies

☐ Metris News magazine featuring case studies and product news

3. Please provide your personal contact information

First name ___________________________ Last name ___________________________
Company ________________________________________________________________
Job title _________________________________________________________________
E-mail _________________________________________________________________
Phone _________________________________________________________________
Address ________________________________________________________________
Zip ____________ City ____________ State/province ________________________________
Country ________________________________________________________________

Please fax this page to +32 16 74 01 03,
or submit your information request on www.metris.com.
THE METRIS COMPANY

Metris designs, develops and markets a unique range of 3D hardware and software inspection systems servicing design and manufacturing industries. The company’s reliable and innovative metrology solutions cover the full range of measurement volumes required by automotive and aerospace customers, in both fixed and portable configurations and with optical and touch sensors.

Metris provides best-in-class precision equipment and metrology solutions for precise measurements featuring classical CMMs and articulated arm CMMs.

Metris is the market leader for CMM based laser inspection, with the Metris LC and XC laser scanners offering full surface and feature measurement.

Metris Optical CMMs are portable, handheld coordinate measuring machines, with a proven track record in engineering, pre-production and quality control applications. The Optical CMMs can also be used in motion analysis and robot calibration applications.

Metris ModelMaker 3D scanners are the best-in-class articulated arm scanners for inspection and reverse engineering.

The Metris Laser Radar is the top solution available to the manufacturing industry that provides a fully automated, non-contact measurement and inspection capability for large volume applications of up to 60 meters.

The Metris iGPS is a modular, large volume tracking system enabling factory-wide localization of multiple objects with metrology accuracy, applicable in manufacturing and assembly.

The X-ray and CT inspection systems provide a detailed insight in the internal structure of the part. Typically used for inspection of PCB electronics, small casting, plastics, these systems facilitate detection of material defects, assembly and interconnectivity issues.

Metris also provides a full range of complementary software solutions for CMM and point cloud based inspection and reverse engineering applications.

Metris completes its product portfolio with a vast range of support, metrology and integration services.

www.metris.com