3D LASER SCANNING

PART TO CAD INSPECTION

REVERSE ENGINEERING

CMM SCANNING SOLUTIONS
Laser scanning solutions for CMM
LC60D / LC50C Digital laser scanners
LC15 High resolution digitizing
XC50 Cross Scanners
Smooth CMM integrations
Focus Scan
Focus Inspection
Focus Reverse Engineering
Serving a wealth of applications
THE BENEFITS OF LASER SCANNING

D Laser scanning results in a complete 3D point cloud within minutes
Laser scanning enables complete inspection and modeling of complex freeform, multi-filleted or featured parts. Using traditional touch probes measuring complete parts can take hours or even days.

D Laser scanning is a non-contact measurement technology
Laser scanning is suited for measuring flexible or fragile materials that often present serious challenges for touch probes due to the risk of indentations or surface scratches.

D Laser scanning is fully compatible with touch probe technology
The operator can easily switch between laser probe and touch probe maintaining all existing functionality of the coordinate measuring machine (CMM). In addition it is possible to combine touch probe alignments and scanner measurements.

D Laser scanning shortens the development cycle and improves product performance
Once a digital copy of the prototype has been acquired, product verification, engineering analysis and other functions can take place concurrently by OEM’s and suppliers at different locations.

D Metris provides solutions from scanning to inspection or reverse engineering
Using a whole product approach reduces the total measurement and analysis time, hence increasing efficiency of the inspection process and reducing costs.

“Metris provides solutions from scanning to inspection or reverse engineering”

LC15
High resolution digitizing

LC60D
High speed digitizing

XC50 / XC50-LS
Feature measurements & complex geometries

“A Metris laser scanner upgrades your 3-axis CMM into a powerful 5-axis optical measuring device”

“The non-contact 3D measurement of complex surfaces has become an important tool in many applications: inspection, product development and reverse engineering”
LC60D / LC50C Digital line scanners

**REVOLUTIONIZING LASER SCANNING**

LC60D is the premium model of LC series of line scanners, as it sets new productivity standards by tripling today’s common scan rates. It scans nearly all material surfaces at rates never achievable in the past, without requiring manual sensor adjustment altogether. LC60D fits most CMM brands and can be used in combination with various manual localizers.

The LC50C features the same core digital technology as the LC60D, and is an ideal scanner for digitizing features and freeform objects with uniform surface properties.

**APPLICATIONS**

Inspection / Reverse Engineering of
• Sheet metal parts
• Castings
• Turbine blades
• Plastics
• Tools, dies etc.

**TECHNICAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th></th>
<th>LC60D</th>
<th>LC50C</th>
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<tbody>
<tr>
<td>Scan speed</td>
<td>75,000 pts/sec</td>
<td>25,000 pts/sec</td>
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<tr>
<td>Laser stripe width</td>
<td>60mm (2.36”)</td>
<td>50mm (1.97”)</td>
</tr>
<tr>
<td>Field of view</td>
<td>60mm (2.36”)</td>
<td></td>
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</tbody>
</table>

**FEATURES**

• Scanning at 75,000 thousands of points/second
• Scans any material thanks to Enhanced Sensor Performance (ESP3)
• Accuracy of 15μm
• Data collection over multi-wire is tightly integrated with most CMM brands and types
• Designed for maximum operational stability and robustness and minimum warm-up time
• Fully compatible with Renishaw PH10 and automatic change racks (ACR)

*Depends on CMM & according to Metris acceptance procedure
LC15 High resolution digitizing

AN EYE FOR DETAIL

In today’s inspection processes, there is ever-increasing demand for inspecting more - and often smaller - objects with higher accuracies. Thanks to its smaller field of view, the LC15 is the ideal scanner for digitizing smaller objects with higher point density and tighter tolerances.

FEATURES

- High resolution & accuracy laser stripe scanners
- High speed scanning up to 19200pts/s
- Cutting edge lightweight design
- Fully compatible with Renishaw PH10 and ACR-1 and ACR-3 exchange rack

APPLICATIONS

- Inspection of mobile phones, turbine blades, small tools
- Reverse engineering with a need for the highest accuracy

TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>LC15</th>
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<td><strong>Field of view</strong></td>
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<td><strong>Stand-off distance</strong></td>
<td>65mm (2.56&quot;)</td>
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<tr>
<td><strong>Accuracy</strong>*</td>
<td>8μm (0.0003&quot;)</td>
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<tr>
<td><strong>Laser light</strong></td>
<td>Class 2</td>
</tr>
</tbody>
</table>

* Depending on CMM & according to Metris acceptance procedure
ADDITIONING A NEW DIMENSION TO 3D LASER SCANNING

The Cross Scanner is a patented high-speed, multi-stripe laser sensor targeting the inspection of features and gap & step in automotive applications. Mounted on a coordinate measuring machine, the Cross Scanner enables more efficient scanning of features such as holes, slots, pockets and gap & step between body panels.

- Patented multi-stripe, multi-angle laser scanner viewing 3 laser stripes from 3 angles
- Optimal point distribution in all directions
- No re-orientation during scanning:
  - No need for an extra C-axis
  - Faster digitizing
- True 3D digitizing resulting in high accuracy feature measurements
- Long stand-off version enables scanning over clamped parts and inside deep pockets
- Fully compatible with Renishaw PH10 and ACR-3 exchange rack
The reference for feature measurements

APPLICATIONS

• Feature inspection
• Gap and flush detection
• Sheet metal inspection: slot, holes, etc
• Inspection of castings

XTCHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th></th>
<th>XC50</th>
<th>XC50-LS</th>
<th>XC50</th>
<th>XC50-LS</th>
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<tr>
<td>Laser stripe width</td>
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<td>3x50mm (3x1.97&quot;)</td>
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<tr>
<td>Field of view</td>
<td>3x50mm (3x1.97&quot;)</td>
<td></td>
<td>3x50mm (3x1.97&quot;)</td>
<td></td>
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<tr>
<td>Stand-off distance</td>
<td>70mm (2.75&quot;)</td>
<td>180mm (7.08&quot;)</td>
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<tr>
<td>Accuracy*</td>
<td>15µm (0.0006&quot;)</td>
<td></td>
<td>20µm (0.0008&quot;)</td>
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<tr>
<td>Laser light</td>
<td>Class 2</td>
<td></td>
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<td></td>
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</tbody>
</table>

* Depending on CMM & according to Metris acceptance procedure
Smooth CMM Integrations

Metris scanners are seamlessly integrated with Metris’ own LK series of machines and other leading CMM manufacturer’s products. The Metris scanning solutions are driven by native CMM software packages or by Metris scanning software.

- Current integrations in CMM software: PC-DMIS, LK CAMIO Studio, Metrolog, Mitutoyo Cosmos, Prelude Inspection
- Worldwide installations with Hexagon (Brown&Sharpe, DEA), Coord3, Mitutoyo, LK, Mora, Wenzel, Renishaw, Dukin, Zeiss, ZettMess, etc.

THE REFERENCE FOR CMM BASED LASER SCANNING

Metris scanners are seamlessly integrated with Metris’ own LK series of machines and other leading CMM manufacturer’s products.

KEY BENEFITS

- Integration on Metris LK CMM guarantees a safe upgrade path to optical metrology
- CAMIO provides single software for point and point cloud analysis
- Plug and play integration due to joint developments
- Worldwide support network through CMM manufacturers
Focus Scan

Driving the CMM...

Focus Scan is the driving force behind Metris’ range of scanning solutions integrated on CMM’s. The software also handles the pre-processing of digitized data for downstream applications such as full part to CAD inspection and reverse engineering. The Focus Scan Offline software enables the user to create, modify and prove out part programs using only 3D CAD models instead of using the actual CMM hardware. As programs are created and edited, users visualize the scanning probe, part and scanning paths in real-time 3D graphics.

Key Features

- Automated qualification of the PH10 orientations
- Automated scanner calibration update
- Automated velocity compensation
- Online and offline scan path generation
- Use of CMM error map compensation
- Polyline path scanning
- Adjustable scanner parameters
- Full toolbox for point cloud processing
**Focus Inspection**

**POWERFUL INSPECTION SOFTWARE**

Focus Inspection is a workflow based software solution for 3D and feature comparison between point clouds and CAD models. It is used for in-depth first article inspection, tool validation, wear analysis and 3D dimensioning. Focus Inspection also enables automation of your inspection processes.

**KEY FEATURES**

- Superior point cloud performance
- Configurable, workflow based user interface
- Full part, section and feature inspection
- Full 3D viewing capabilities
- Tree for data organizing and handling

- Workflows ready for automation (Record/edit/replay of macro's)
- Turbine Blade Inspection module
  - Section, leading & trailing edge measurements
  - Bow, displacement, twist results
Ready to Compare

1 IMPORT NOMINAL DATA
• IGES, STL, SAT®, VDA, STEP, Pro-E, CATIA V4/V5
• Automatic alignment of surface normals
• Feature detection: hole, slot, plane, etc.

2 IMPORT MEASURED DATA
• Import ASCII, STL, Metris Base/Scan files
• Quick shading
• 3D curvature/grid filter
• Triangulation/meshing
• 2D Feature detection: hole, slot, plane etc.
• 3D Feature detection: cone, cylindrical pin, T-Stud, welded bolts etc.

3 ALIGNMENT
• n-point
• Feature based (RPS)
• General 3-2-1
• (Constrained) best fit
• 2D/3D section best fit
• Interactive alignment

4 ANALYSIS
• Full part to nominal comparison
• Section/feature comparison
• Gap and flush measurement
• Edge comparison
• Point to point comparison
• Continuous or discrete tolerance settings
• Easy dimensioning
• Wall thickness check

5 FLEXIBLE REPORTING
• Customizable, Excel based reports
• User defined fly-outs (text, deviation values)
• ISO-style dimensioning
• Gap and step dimensioning
• HTML, PDF reporting

KEY BENEFITS
• Automatic inspection for repetitive measurement cycles
• Easy to learn and use
• Automation for repetitive inspection for repetitive inspection cycles
• User interface reflects inspection workflow
• Localized versions significantly reduce learning curve
• Platform enables building of application specific modules, e.g. Turbine blade analysis
Focus Reverse Engineering provides next-generation functionality and workflow enhancements for the design and manufacturing of free-form parts and products. Focus Reverse Engineering’s unique multi-format modeling provides users with best-off class polygonal and surface/solid tools. The fully associative approach enables designers to evaluate and modify at any stage, in the polygon, curve, surface, solid format of choice.

1 IMPORT & PREPARATION OF DATA
• Neutral point cloud formats: IGES, ASCII, OBJ
• Neutral mesh formats: STL, OBJ, VDA, STP
• Import SAT® mesh format
• 3D curvature/grid filter
• Triangulation/meshing

2 MESH/POLYGON EDITING TOOLS
• Fill global/local holes
• Global/local smoothing
• Reduce/increase mesh density
• Mesh modeling tools (global/local deformation)
• Export mesh in STL format for downstream applications

3 CURVE CREATION
• Automatic feature recognition
• Automatic curve network and surface creation
• Create cross-sections, boundary and theoretical intersection curves
• Edit curves precisely and interactively
• Export curves in IGES format for downstream applications

KEY FEATURES
• Creation of curves and surfaces over missing or incomplete data
• Automated curve, curve network, and surface creation
• Dynamic templates (mesh, curves, surfaces) for model re-use
• Advanced feature detection tools
• Real-time update of mesh, curves or surfaces when modifying
• Optimized for fast meshing and rendering
• Mesh, curve, and surface-based design, analysis, and sculpting tools
• Parting line, undercut removal, and shelling tools
• Create/query solid tools

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A bridge between models & CAD

4 SPRING MESH CREATION
- Capture desired levels of details from mesh using patented spring mesh approach
- Full control over layout, parametrization and relaxation
- Export spring mesh in STL format for downstream applications
- Export spring mesh in OBJ as Quads

5 SURFACE/SOLID CREATION & EDITING
- Full control over global/local surface fitting and parametrization
- Edit/trim surfaces
- Automatically manage continuity [C0, C1]
- Evaluate accuracy of fitted surface
- Extract displacement maps from scanned data
- Supports Nurbs and Bezier output format
- Convert surfaces into closed or sheet solids

An easy to use solution to handle reverse engineering workflows from point clouds to polygons, curves, surfaces, and solids

APPLICATIONS
- Reverse engineering
- Polygon-based modeling
- FEA & CFD preparation
- Legacy data processing
- Rapid prototyping
- Design for manufacturability
- Digital archiving

KEY BENEFITS
- Easy to learn and use (hours, not days)
- Rapid and accurate results
- Flexible control from precise, interactive to fully automated results
- Scales from entry level to the most demanding applications
- Time and cost savings through workflow and knowledge re-use
- Seamless compatibility with industry standard CAD/CAM/CAE applications
Serving a wealth of applications ...

SHEET METAL

CASTINGS

AUTOMOTIVE INTERIORS

AUTOMOTIVE

BMW, Bosch, Cummins Engine, DaimlerChrysler, Faurecia, Ford, GE Plastics, GM, Honda, Hyundai, Johnson Controls, Lear, Magna, Opel, Rotax, Toyota, Volkswagen, Volvo, etc.
... in a broad industry range

PLASTIC INJECTION MOLDING

TURBINE BLADES

DESIGN & REVERSE ENGINEERING

AEROSPACE & ENERGY
Airbus, Boeing, GE Jet Engine, Gemco, Pratt&Whitney, Rolls Royce, Siemens Power Generation, Snecma, Stork, US Air Force, etc.

CONSUMER, MEDICAL, TOYS
Adidas, Atlas Copco, Balda, Ericsson, HP, Miele, Nike, Nikon, Nokia, Sony, Swarovski, Walt Disney, etc.
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.