



Laser Radar MV224/260



Automated large volume inspection

The future for large scale metrology

NON-CONTACT LASER RADAR

Developed for use in industrial environment, the portable Metris Laser Radar offers automated, true non-contact geometric verification of large scale objects. As such, Metris Laser Radar overcomes the efficiency limitations of traditional contact based tracker measurements. In a nutshell, Metris Laser Radar halves operator overhead, avoids damaging risk, and eliminates the need for photogrammetry dots, laser tracker spherically mounted retroreflectors or handheld probes. Altogether, no offsets need to be calculated because measurements are taken directly from part surfaces.

LASER RADAR WORKING PRINCIPLE

Metris Laser Radar uses proprietary technology to directly measure points and surfaces or scan features. The measurement is achieved without mechanical or optical probe contact of any kind. Metris Laser Radar is used to accurately align large parts during assembly; certify tooling and then monitor its repeatability during production; or measure metal, plastic and composite parts and compare them to their CAD models. Typical test parts for Laser Radar are aircraft components, such as fuselage, wings, communication antennae, satellite solar panel and engine cowling. Metris Laser Radar requires one operator for the setup, and then it runs unattended. Typical test parts for Laser Radar are aircraft components - such as fuselage, wings, inlet cowlings -, satellite solar panel, communication antennae, boat hulls etc. The system requires no conditioned environment or expensive tooling. The system works indoor and outdoor in any lighting, and operates on any surface with a reflectivity of less than 1 percent.



Metris Laser Radar is an optical measurement system that provides fully automated, non-contact measurement and inspection capability for large volume applications spanning up to 60 meters with metrology accuracy.

A WIDE VARIETY OF APPLICATIONS

Metris Laser Radar covers a variety of quality assurance applications, including part-to-CAD comparison and first article inspections, incoming quality assurance, in-process quality assurance, and outgoing quality assurance. As Metris Laser Radar directly scans part surfaces, the instrument is ideally suited to reliably measure tight pockets, small holes and otherwise inaccessible areas, all within a contiguous coordinate system. The latter avoids reassembling multiple data clouds after having used multiple measurement standpoints.

- **Tool building and alignment, including locating and adjusting tool features in real time.** The operator drives the system to a specific point in space, and sets it up to continuously measure a part until it is positioned at its nominal location.
- **Digitalization and documentation of as-built tools and die surfaces.** Metris Laser Radar measures tools and surfaces for wear, and monitors fiducial monuments and surfaces for tolerance and stability.
- **In-process applications,** such as aligning aircraft and vehicle components and supporting robotic positioning. Metris Laser Radar inspects orientation, gap, flush and fit conditions, and dynamically verifies tool and fixture stability. A single machine is sufficient to automatically monitor multiple manufacturing workstations without the need for operator intervention.
- **Routine and event driven maintenance,** such as static and dynamic inspection of aircraft, vehicle and heavy tooling assembly; monitoring deformation of building, tunnel and bridge structures after seismic activity; and accurate evaluation of surface fractures to predict fatigue and structural failure
- **Model digitalization,** performing design layups, and reading data directly into a wide variety of CAD packages. The operator can gather data in uniform scans while controlling the scan density and area.

KEY BENEFITS

- High measurement throughput
- Lower resource costs
 - One man operation
 - Reduced fixed tooling requirements
- Portable system enables on-site measurements
- Minimum setup time
- High accuracy measurements
- Enables difficult or previously impossible metrology jobs

Laser Radar specifications

SINGLE POINT 3D MEASUREMENT UNCERTAINTY¹

Range		/_Az	/_Az	Range	3D Uncertainty	
m	ft	μm/m	μm/m	μm + 2.5μm/m	μm	in
1	3.3	6.8	6.8	12.5	16	0.0006
2	6.6	13.6	13.6	15.0	24	0.0010
5	16.4	34.0	34.0	22.5	53	0.0021
10	32.8	68.0	68.0	35.0	102	0.0040
15	49.2	102.0	102.0	47.5	152	0.0060
20	65.6	136.0	136.0	60.0	201	0.0079
24	78.7	163.2	163.2	70.0	241	0.0095
60 ²	196.8	408.0	408.0	160	599	0.024

¹ Accuracy (2 σ) defined by measurement of a tooling ball target (grade 25 or less) under stable environmental conditions.

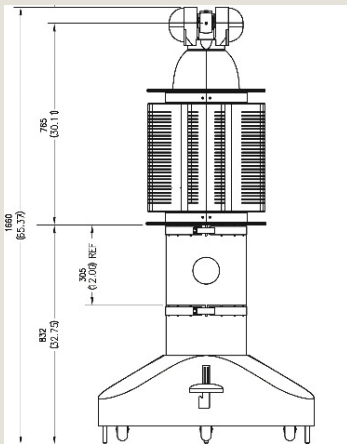
² Applies to MV260

FIELD OF VIEW

- Azimuth: 360°
- Elevation: ±45°
- Operating range for
 - MV224: 1–24m (3.3–78.7ft)
 - MV260: 1–60m (3.3–164ft)

SURFACE SCANS:

Measurement mode	Rate (pts/sec)	
	Typical	Max
Vision scan	125-500	1000
Metrology scan	2	4
Enhanced metrology scan	0.5	1



FEATURE/TARGET MEASUREMENT CAPABILITIES

- Tooling ball (point center)
- Surface patch (normal vector from point)
- Surface/vector intersection (differential normal vector between real & nominal surface)
- Section cut (collects points on real part in user-defined section planes)
- Trihedral (coordinate frame reference)
- Retro reflector (center)
- Hole (center, radius)

ENVIRONMENTAL CONDITIONS

Temperature	
Operational	5° to 40°C (41° to 104°F)
Storage	-10° to 60°C (14° to 140°F)
Altitude	
Operational	-400 to 3000 m (-1312 to 9843ft)
Storage	-400 to 7000 m (-1312 to 22966ft)
Humidity	
10-90% (non-condensing)	

ELECTRICAL REQUIREMENTS

System/UPS¹

- 165 - 270 VAC, 50/60Hz, 5A max
- 85 -130 VAC, 50/60Hz, 10A max

¹ Unit specification set at time of order.

DIMENSIONS AND WEIGHTS

	L x Wmm (in)	Weight - kg (lbs)
Workstation	914 (36) x 610 (24)	119 (262)
Scanner	454 (18) x 381 (15)	40 (88)
Stand	∅914 (36)	29 (65)
Height extension	305 (12)	2.1(4.6)

OTHER FEATURES

- Integrated video camera to follow laser line
- Red pointing laser (Class II)
- Point and click video interface control of scanner
- Expanded line-of-sight around and behind objects using mirrors
- Environmental compensation (temperature, humidity, pressure)

METRIS LASER RADAR CUSTOMERS

Airbus, Alenia, Beijing Metrology Institute, Boeing, Daihatsu, General Electric, Hitachi, IMAI Aero, Janicki, Kodak, Korean Air Lines, Lockheed Martin, Maglev, Mission Research Corporation, NASA, Spirit Aerostructures, Sukhoi, Vought, Xian Aircraft, 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.

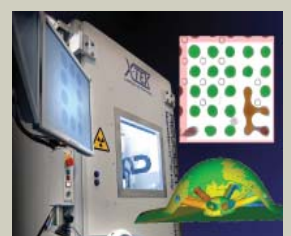
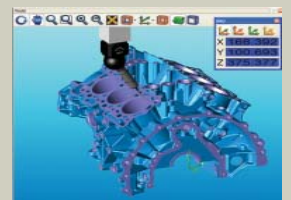
The **Metris Laser Radar** is the top solution available to the manufacturing industry that provides a fully automated, non-contact measurement and inspection capability for large-volume applications of up to 60 meters.

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.



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