

LEICA ABSOLUTE TRACKER AT960

ABSOLUTE PORTABILITY. ABSOLUTE SPEED. ABSOLUTE ACCURACY.



HIGH-END TECHNOLOGY IN ULTRA-PORTABLE FORM

The Leica Absolute Tracker AT960 from Hexagon Manufacturing Intelligence is the first truly portable dynamic six degrees of freedom (6DoF) laser measurement system. Providing a robust solution to even the most challenging large-scale metrology requirements, it offers absolute portability, absolute speed and absolute accuracy – all in one package.

Augmenting proven technology with new innovations, the AT960 is a sophisticated yet user-friendly walk-around coordinate measuring machine (CMM) that fits in just one flight case. With the complete range of Hexagon laser tracker accessories built into the device, the AT960 can be transported easily, unpacked quickly and powered up in minutes to measure in any location.

Offering high-speed dynamic measurement as standard, the AT960 is a single-unit solution for 6DoF probing, scanning and machine controlled inspection. A simple feature pack option also enables real-time robotic guidance.

Combining portability and speed with usability, the AT960 makes operation intuitive, reducing operator workload to minimise the margin for error and save time, effort and money. With applications spanning aerospace, automotive, shipbuilding, manufacturing and many more sectors, the AT960 is the new standard in portable industrial metrology.

All-In-One Design

With all the equipment for measurement to a reflector, probing device, laser scanner or machine control unit built in, the compact all-in-one unit is ultra-portable for easy transportation to measure anywhere.

PowerLock

Interrupted line of sight is automatically re-established in a ± 5 degree field of view with no user interaction required for ease of use and exceptional performance in even the most crowded measurement volumes.

Battery Power

Independent hot-swap battery power supply allows a quick and easy cable-free setup in almost any location for better portability, offering a flexible solution that lasts up to a day's shift – wherever the tracker is needed.

Wi-Fi

Built-in Wi-Fi enables simple setup and communication with the PC for truly wireless operations, also providing remote control options via laptops, tablets or smartphones so the tracker can be operated by a single user.

IP54

The IEC-certified sealed unit guarantees ingress protection against dust and other contaminants, enabling the tracker to measure effectively in even the harshest environments.

MeteoStation

Integrated environmental unit monitors conditions including temperature, pressure and humidity to compensate for changes and ensure accurate measurements regardless of external factors.

Overview Camera (OVC)

High-resolution colour OVC enables operators to remotely view the tracker's field of vision, locating targets to measure to fixed reflectors, ideal for static hidden point devices or to supplement documentation.

Orient to Gravity (OTG)

The OTG function enables users to measure with the Z-axis aligned to gravity, ideal for levelling and alignment tasks such as build and inspect of tool and jig fixturing.

Absolute Interferometer (AIFM)

The AIFM single distance unit combines the accuracy of an absolute distance meter and the speed of an interferometer to give readings quickly and accurately with no need for a home point.

Integrated Mini Variozoom

With a constant field of view in any light conditions, mini variozoom provides 6DoF measurement capabilities for accurate probing, scanning and machine control applications.

1 kHz Data Output

Real-time architecture with dynamic performance gives a measurement rate of up to 1 000 points per second, enabling more detailed data capture, more quickly.

7DoF Real-Time Feature Pack EtherCAT (RTFP-EC) Option

Using an Industrial Ethernet interface to deliver '7DoF data' – timestamped measurement data on 3D or 6DoF targets – with minimum jitter and small latencies, the RTFP-EC supports highly-demanding automated and robotic systems.



ABSOLUTE PORTABILITY

QUALITY AND PRODUCTIVITY ON THE MOVE

With a longstanding commitment to research and development, Hexagon provides innovative solutions that help customers to drive productivity. The Leica Absolute Tracker AT960 – designed to give quicker, more accurate results and a better user experience at the point of production – is the latest product of this approach.

The AT960 brings together functionality and usability, creating an ultra-portable coordinate measuring machine that fits in a single box. Featuring optional battery operation and Wi-Fi as standard, the AT960's revolutionary integrated-technology design makes lengthy setup a thing of the past. An enhanced quick-release mechanism, robust shock resistance and an inbuilt tilt detection system take the hassle out of remounting the laser tracker on the fly. With built-in levelling equipment, IP54 protection and a system weight of less than 14 kg, the AT960 can be taken almost anywhere.





“

The Leica Absolute Tracker AT960 is now a key piece of our metrology toolset when travelling to each and every race. The reduction in the weight of the tracker has significantly reduced shipping costs whilst guaranteeing the very best in precision.”

Chris Charnley,
Quality Manager, Red Bull Racing



“The portable Leica Absolute Tracker has enabled us to grow our metrology capabilities at the circuit, no matter where in the world we’re racing. Not only has it improved the precision of the car build, but it has also saved valuable time during the inspection processes.”

Chris Charnley,
Quality Manager, Red Bull Racing



ABSOLUTE SPEED

DYNAMIC FEATURES TO MEASURE AND GO

Metrology equipment should help complete a task quickly, not slow down the process. The Leica Absolute Tracker AT960 offers high-speed probing, scanning and machine control solutions as well as reflector measurements so inspections can be made using the most efficient method for the job, while intuitive controls save time in training and operations.

Automatic Target Lock

PowerLock provides intelligent targeting to automatically locate the reflector or probe for the easiest laser tracker operation yet. Now in its third generation, this patented active vision technology allows the AT960 to instantly re-establish an interrupted beam and continue the measurement with no user intervention. Effective within the maximum working range of the tracker, PowerLock leaves operators to simply measure.

High-Speed Dynamic Measurement

The Leica Absolute Interferometer (AIFM) enables the AT960 to measure a moving target with the fastest speed possible. In combination with a true real-time operating system, the AIFM and PowerLock allow the AT960 to continue measuring with a maximum uncertainty of just 10 μm after beam interruption and deliver a data rate of 1 000 points per second.

7DoF Real-Time Machine Guidance

The Real-Time Feature Pack (RTFP-EC) option enables the AT960 to meet the deterministic measurement data-delivery requirements of high-end automated installations. Built on the industry-proven EtherCAT protocol, it enables the delivery of 6DoF measurement data at up to 1 kHz data output rate with accurate timestamps. Known as '7DoF' measurement data, it enables real-time machine control even in highly-dynamic robotic setups.

Easy-To-Use Controls

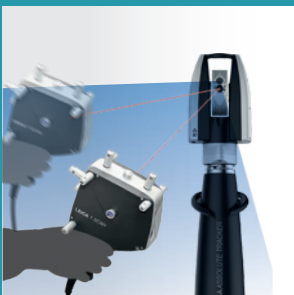
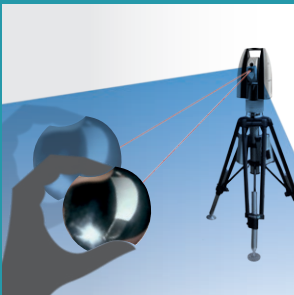
The wireless AT960 with battery option takes the difficulty out of setup, while colour touch-screen controls enable operators to prepare the tracker without worrying about how to correct any problems. Proven Leica TrackerPilot check and compensation architecture means basic adjustments can be made in the field, while robust design guarantees on-specification operations with minimal calibration and servicing.

ABSOLUTE ACCURACY

THE RIGHT WAY TO MEASURE WHATEVER THE APPLICATION

Driven by the absolute distancing capabilities of the AIFM, the Leica Absolute Tracker AT960 is capable of exceptionally accurate readings across several inspection methods. This flexible functionality and customisable operation allows operators to select the best method for each application and never compromise accuracy.

Built-in variozoom technology provides 6DoF measurement as standard, making the AT960 compatible with the latest Hexagon probing and scanning solutions range as well as traditional reflectors to offer the right way to measure every time. These four methods of measurement, along with versatile quick-release mounting options including inclined and inverted operations, ensure that the accuracy of the AT960 can always be applied to the task. With a completely sealed unit certified to IP54 and integrated environmental monitoring, the AT960 delivers reliable results in even the harshest conditions.



Reflector Measurements

With optical centring accuracy of $\pm 3 \mu\text{m}$, Hexagon reflectors offer a highly-accurate solution for line of sight measurements. Automatically located and tracked by PowerLock, reflectors allow high-speed dynamic measurement in volumes of up to 120 m (Ø). Available in a range of types and sizes for various applications, they are compatible with any Leica Absolute Tracker including the AT960.

Handheld Probing Solutions

Small, light and accurate, the Leica T-Probe is a wireless battery-operated probing solution for measuring even the most hard-to-reach points. Featuring user-assignable multi-function buttons and integrated measurement feedback along with automatically recognised changeable styli, it sets the benchmark for operator-friendly measurement applications in volumes of up to 40 m (Ø).

Handheld Scanning Solutions

The faster, more accurate and less damaging alternative to scrubbing a reflector over a surface to record multiple points, the Leica Absolute Scanner LAS-20-8 and Leica T-Scan 5 laser scanners can digitise over 150 000 points per second even on shiny metallic or dark surfaces. With no powdering required, preparation time is minimal, while automatic adjustments ensure the best possible readings in a single pass.

Integrated Solutions

The AT960 supports tactile and non-contact robotic inspection with the Leica T-Mac and probe or the Leica T-Scan 5 laser scanner. The Leica T-Mac also enables machine control and robotic guidance for production process improvement. Generating not just positional data, but also the pitch, roll and yaw of an object, the system can deliver up to 1 000 measurements per second, while the optional addition of Industrial Ethernet protocols enables real-time synchronisation and correction.

“Microns and milliseconds are intrinsically linked. Using portable Leica Absolute Trackers to ensure the accuracy of car build on both sides of the garage results in increased quality and reliability for the car on track.”

Chris Charnley,

Quality Manager, Red Bull Racing

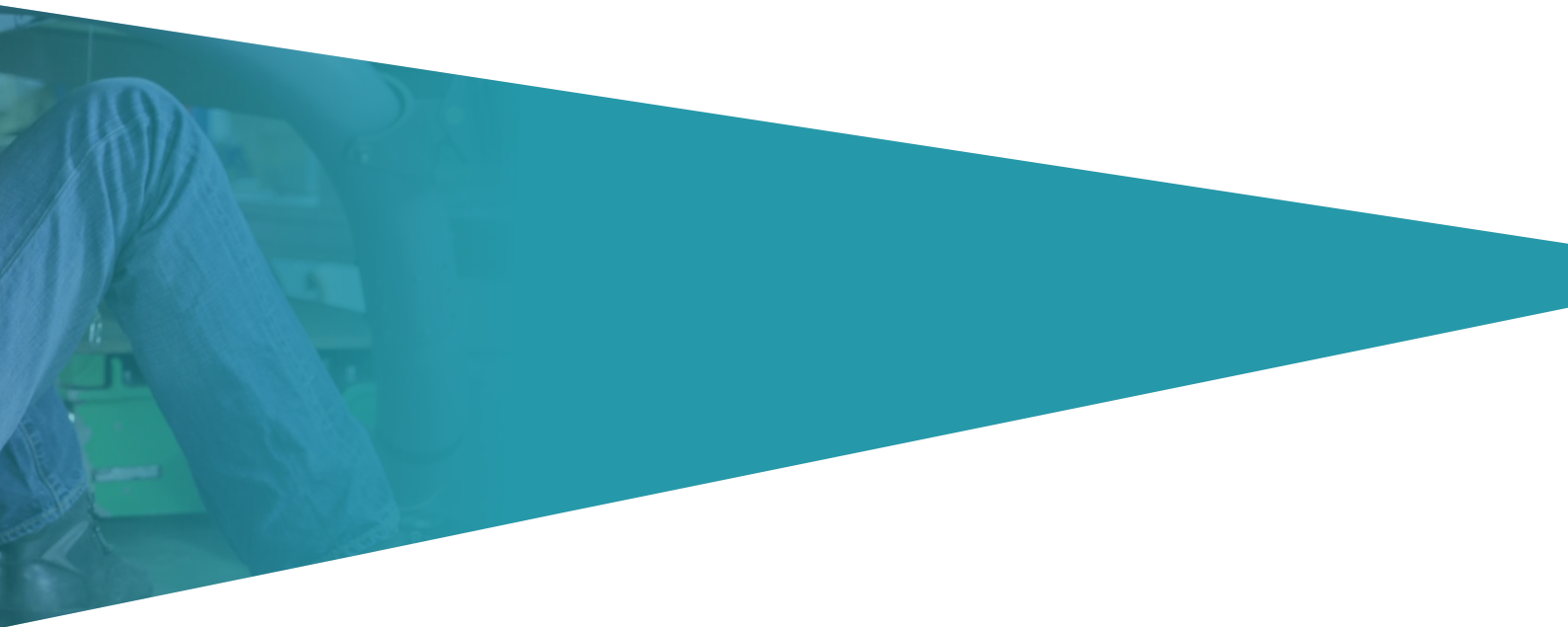
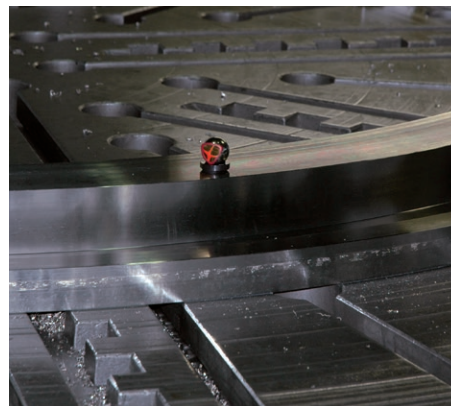
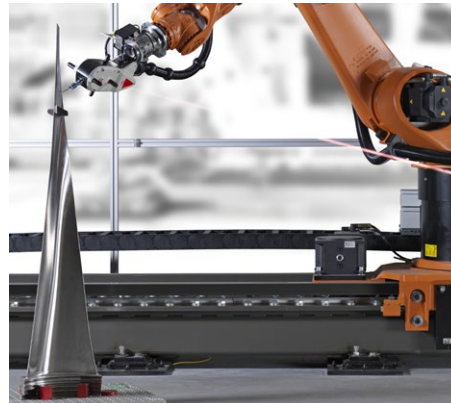
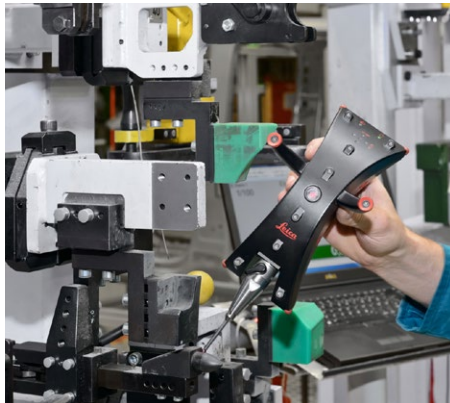


VERSATILE AND RELIABLE FOR ANY INDUSTRY

Every industry has specialist metrology requirements. Yet the simple setup and adaptable operation of the Leica Absolute Tracker AT960 make it an outstanding solution for a whole host of applications.

With Hexagon's specialist software suites, the AT960 can be optimised for use in a huge range of industries – offering a full-system solution to make complicated measurement tasks quick and easy. For high-definition surface scanning and feature extraction, automation and machine control, hidden point probing or traditional dynamic 3D reflector measurements, the AT960 is the go-to laser tracker system.





SPECIFICATIONS

Accuracy *

$$U_{x,y,z} = \pm 15 \mu\text{m} + 6 \mu\text{m/m}$$

* All accuracies are specified as maximum permissible errors (MPE) and in accordance with ASME B89.4.19-2006 & ISO10360-10 using precision Leica 1.5" Red Ring Reflectors up to 60 m distance unless otherwise noted.

Angle accuracy	$\pm 15 \mu\text{m} + 6 \mu\text{m/m}$
Distance accuracy AIFM	$\pm 0.5 \mu\text{m/m}$
Dynamic lock on	$\pm 10 \mu\text{m}$

Orient to Gravity (OTG)	$U_{z(\text{OTG})} = \pm 15 \mu\text{m} + 8 \mu\text{m/m}$
-------------------------	--

Environmental working conditions	
Dust/Water	IP54 (IEC 60529)
Operating temperature	0°C to +40°C

Data output rate	1 000 points/sec
------------------	------------------

Laser safety	Class 2 IEC 60825-1 (2014-05) "Safety of laser products" EN 60825-1 (2007-10) "Safety of laser products"
--------------	--

Leica T-Probe	$U_{x,y,z} = \pm 35 \mu\text{m} *$
---------------	------------------------------------

* Additional T-Probe uncertainty to be added according to ISO/IEC Guide 98-3:2008 to the existing Leica Absolute Tracker AT960 " U_{xyz} " uncertainty for a complete " U_{xyz} " uncertainty up to 25 m distance.

Leica T-Scan 5	$U_L = \pm 60 \mu\text{m}$ 210 000 points/sec
----------------	--

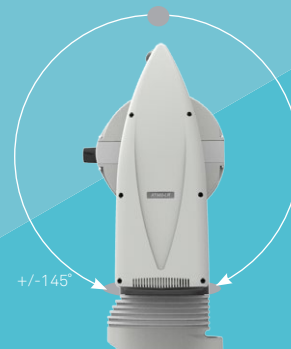
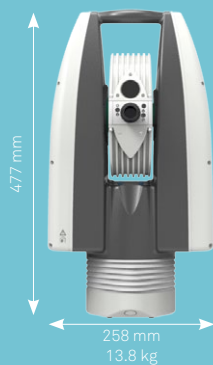
Leica Absolute Scanner LAS-20-8	$U_L = \pm 60 \mu\text{m}$ 150 000 points/sec
---------------------------------	--

Leica T-Mac *	
Position accuracy	$\pm 15 \mu\text{m} + 6 \mu\text{m/m}$
Typical rotation accuracy	± 0.01 degree **
Accuracy of timestamp	< 5 microseconds

* All accuracies are stated in maximum permissible error (MPE). Typical results are half of MPE.

** Typical accuracy





3D

6DoF

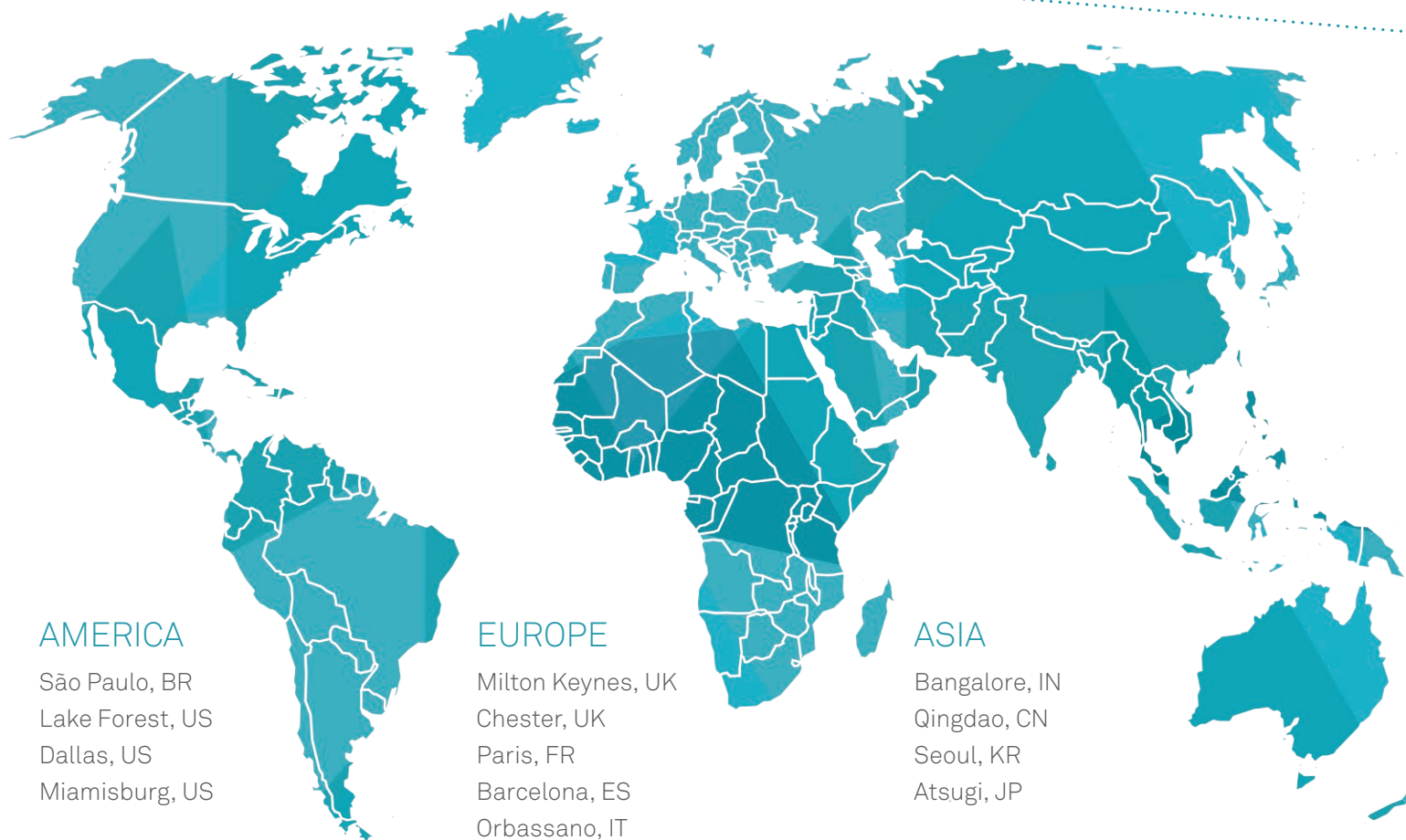


Measurement volume (Ø)

AT930	160 m*	-
AT960-MR	40 m	20 m
AT960-LR	160 m*	40 m
AT960-XR	160 m*	60 m*

*typical measurement volume (Ø)





AMERICA

São Paulo, BR
Lake Forest, US
Dallas, US
Miamisburg, US

EUROPE

Milton Keynes, UK
Chester, UK
Paris, FR
Barcelona, ES
Orbassano, IT
Unterentfelden, CH
Gothenburg, SE
St. Petersburg, RU
Wetzlar, DE
Prague, CZ
Ankara, TR

ASIA

Bangalore, IN
Qingdao, CN
Seoul, KR
Atsugi, JP

GLOBAL PRESENCE FOR FAST LOCAL RESPONSE

Hexagon's increasing global presence gives customers guaranteed aftersales support and services, wherever they are in the world. With the largest dedicated service team of any metrology equipment manufacturer, the customer experience does not end at purchase.

Committed to providing local services that minimise costs and downtime for customers, a growing network of operations centres and partners on five continents enables Hexagon to offer a complete range of aftermarket support including servicing and repairs, certification and calibration, software maintenance and upgrades, contract inspection and programming, system upgrades and operator training.

DRIVING INNOVATION

FOR OVER 25 YEARS

The Leica Absolute Tracker AT960 is the latest innovation in laser tracker technology. Drawing on mature technology from over 25 years of research and development to raise the bar once again, it offers the most advanced and accurate Hexagon portable tracker system ever to help customers measure their world in increasing detail.

Hexagon's Leica range has an unrivalled pedigree for laser tracker technology, having introduced the original shop-floor tracker system to the market in 1990. Since then, Hexagon products have continued to revolutionise the technology, creating the first absolute distance meters, 6DoF trackers, absolute interferometers and the PowerLock active vision system. This continuing desire for progress ensures the Leica Absolute Tracker always stands for quality.





HEXAGON

MANUFACTURING INTELLIGENCE

Hexagon Manufacturing Intelligence helps industrial manufacturers develop the disruptive technologies of today and the life-changing products of tomorrow. As a leading metrology and manufacturing solution specialist, our expertise in sensing, thinking and acting – the collection, analysis and active use of measurement data – gives our customers the confidence to increase production speed and accelerate productivity while enhancing product quality.

Through a network of local service centres, production facilities and commercial operations across five continents, we are shaping smart change in manufacturing to build a world where quality drives productivity. For more information, visit HexagonMI.com.

Hexagon Manufacturing Intelligence is part of Hexagon (Nasdaq Stockholm: HEXA B; hexagon.com), a leading global provider of information technologies that drive quality and productivity across geospatial and industrial enterprise applications.



COORDINATE MEASURING MACHINES



3D LASER SCANNING



SENSORS



PORTABLE MEASURING ARMS



SERVICES



LASER TRACKERS & STATIONS



MULTISENSOR & OPTICAL SYSTEMS



WHITE LIGHT SCANNERS



METROLOGY SOFTWARE SOLUTIONS



CAD / CAM



STATISTICAL PROCESS CONTROL



AUTOMATED APPLICATIONS



MICROMETERS, CALIPERS AND GAUGES