Industrial Optical 3D Digitizer

3D Coordinate Measuring
Full-Field Scanning & Inspection
Quality Control & Reverse Engineering
ATOS is an industrial, high resolution, optical 3D scanner. It delivers three-dimensional measurement data quickly and accurately to optimize engineering processes and improve manufacturing workflows.

ATOS is widely used in various industries for components such as sheet metal parts, tools and dies, turbine blades, prototypes, injection molded and casted parts. Full part geometry is captured in a dense point cloud or polygon mesh describing the object’s surface and primitives precisely.

From coins to cars to aeroplanes

ATOS measures different object sizes, surface finishes, and complexities giving versatility to 3D digitizing by delivering:

• Accurate 3D coordinates and high data quality
• Parametric inspection and evaluation
• Full-field deviation to CAD, 2D and part-to-part
• Section-based analysis, GD&T, and trend analysis
• Complete measuring reports

Worldwide integration

ATOS 3D Digitizers are utilized in a large number of different engineering applications to reduce time and eliminate cost with return of investment. Application areas include:

• Quality Control
• Reverse Engineering
• Rapid Prototyping
• Rapid Milling
• Digital Mock-Up

The benchmark scanner, improved

The ATOS 3D Digitizer is the most innovative optical measuring system for three-dimensional coordinate measurement on the market.

Developed since 1995, ATOS has thousands of installations in measurement and analysis rooms, factories, and production halls worldwide. ATOS is metrology tested and widely accepted as the preferred measuring tool. It is engineered with advanced hardware and intelligent software to provide fast precision measurements with flexibility and stability for industrial environments.
Dimensional control for the complete process chain

The ATOS 3D Digitizer impacts the overall process chain from design through manufacturing to maintenance. The integration of ATOS in industrial development and production processes assists in:

- Reducing research and development times
- Improving prototype quality
- Speeding up production times
- Achieving a higher level of quality assurance throughout the entire product life cycle
- Monitoring early trend analysis within series production processes
- Establishing root cause analysis to detect engineering issues
- Reducing rejects and rework, thus saving valuable time and money
- Automating quality control to improve overall quality assurance requiring fewer personnel and increasing performance

ATOS combines flexibility and ease of use with industrial-grade sensor hardware. ATOS Triple Scan produces process safe, high resolution, high quality measurement data even on complex, shiny or dark object surfaces. This combined with GOM’s powerful ATOS Professional software and over 20 years experience in optical measuring techniques makes the ATOS the ideal 3D optical measuring solution for all measuring tasks.
GOM’s ATOS Triple Scan uses innovative and ground breaking measuring and projection technology. It encompasses all of the functions and benefits of GOM’s proven stereo camera setup plus GOM’s latest technological advancements.

**Triple Scan - 3 in 1**

In addition to GOM’s stereo camera technique, the ATOS Triple scan also uses the right and left cameras individually in combination with the projector. This new method results in 3 individual sensors each with different viewing perspectives of the object.

This new technology enables even higher detailed feature capture with faster measurement times for various part sizes, surfaces, finishes, and geometries, regardless of environmental lighting conditions.

**Integrated Photogrammetry**

In complex or large scale applications, up to tens of meters in size, digital photogrammetry is utilized to ensure the highest level of accuracy and optimal process workflow. This integrated measurement solution also assists in complex virtual assemblies and digital mock-ups.

**Blue Light Technology**

GOM’s new narrow banded projection technology enables precise measurements to be carried out independently of environmental lighting conditions, with extremely long service life, minimum heat development, and low maintenance.

**GOM Touch Probe - Tactile measuring**

The GOM Touch Probe enables 3D discrete point measurements in conjunction with ATOS full-field measurements for direct comparison to CAD for measuring difficult to access areas and primitives. Touch probe data can also be utilized for online data alignment.
**Triple Scan for shiny or dark surfaces**
Save time and increase productivity by directly scanning shiny or dark surface objects such as sheet metal parts and dark colored tools/dies while maintaining accuracy and high-detailed resolution.

**Triple Scan for complex part geometries**
Scan rapidly without sacrificing detail. Measure intricate characteristics, deep pockets, fine edges, and complex features such as turbine blades and casted or injection molded parts.

**Mobile measuring system**
Eliminate costs and save time by moving the system to the part. ATOS is completely portable and is easily transported. The dynamic referencing ensures highest accuracy even under difficult environmental conditions.

**Industrial sensor head**
ATOS is engineered with a robust impact resistant carbon fiber housing to protect the integrated cameras and lenses. It is designed for safety and manufactured with the highest level of quality for various application settings.

**ATOS Triple Scan + ATOS Professional**
The ATOS Triple Scan is integrated with GOM’s intelligent ATOS Professional software to form the ultimate metrology solution. Software features include smart mesh processing, parametric inspection, trend analysis, GD&T, reporting, ...

**High resolution measuring cameras**
ATOS Triple Scan comes with up to 12 megapixel high resolution, stereo measuring cameras which are specially developed for precise optical measurements. Accuracy, resolution, and measuring area are completely configurable to the application’s requirements.
The ATOS sensor head is freely positioned, either manually or automatically, in front of the part. After each measurement, the sensor or part is moved to obtain areas not captured in the previous scan. All individual measurements are automatically transformed into a common coordinate system immediately providing the complete 3D point cloud.

Mobile industrial measuring system

ATOS Triple Scan is a mobile measuring system developed for use in industrial environments. ATOS is quick to setup, with just one operator required. No measuring plate with foundation, measuring table or vibration isolation is required. The ATOS dynamic referencing ensures highest accuracy even under difficult environmental conditions.

Semi-automatic measurement

Rotation tables and linear units enable easy, quick, and efficient measurements of small to medium sized objects. The ATOS Professional software directly communicates with these devices to easily manage positions for a simple measurement sequence. Once configured, scanning can be initiated through a remote control.

Integration for all measurement tasks

Full automation with optical metrology from GOM offers:
- Increased efficiency in quality control
- Higher throughput
- Higher repeatability
- More comprehensive part inspections
- Major cost reductions
- Accelerated return on investment

ATOS ScanBox

Designed and constructed specifically for industrial requirements, the ATOS ScanBox is an automated robotic solution. By combining ATOS Triple Scan technology and its process safe software with industrial robotic hardware, it creates the definitive metrology solution for manufacturing environments.

This integration streamlines engineering workflows and facilitates inspection at every stage of the process. Thus becoming an integral part of quality assurance and production processes.
Advanced hardware
The ATOS Triple Scan is designed for flexible automated use in industrial environments. The innovative technology can be integrated with various types of robots and other handling devices. The robot is controlled directly from GOM’s measurement software or via PLC setup, and automatically positions the sensor. GOM’s proven dynamic referencing assures high measurement accuracy, independent from robot accuracy and calibration.

Intelligent software
The ATOS Professional software intelligently orchestrates the automated workflow smoothly without difficulty. The powerful software is independently tested and certified by German and American national measurement laboratories (PTB and NIST). These certifications make it possible to trace all measurement results and to exchange data efficiently with CAD and quality management systems. As a result, the standardized and centralized ATOS inspection process can be implemented across various departments.

Virtual Measuring Room (VMR)
The VMR further advances and evolves the automation experience. The fully integrated solution allows complete reproduction of automated measurement process chains within one software package.

- Offline & online programming
- Building a virtual measuring room
- 3D measurement simulation
- Collision control & safety
- Inspection
- Reporting
3D Digitizing & Inspection Software

ATOS Professional is a process-safe software solution that controls the ATOS 3D Digitizer, produces precise 3D surface data, and offers complete inspection and reporting in one software package.

Full-Field 3D Scanning

ATOS Professional guides the operator through the complete scanning procedure. 3D data is available directly after fringe projection.

Single scans are automatically combined using an intelligent algorithm based on a combination of reference points and/or surface matching.

Self-monitoring for process integrity

ATOS is a self-monitoring measuring system that verifies calibration status, transformation accuracy, environmental changes and part movement.

This makes ATOS an industrial measuring solution that is ideal for operating in industrial production environments.

Parametric Inspection

From CAD import to reporting, the ATOS Professional software contains all the evaluation tools for an extensive analysis of parts and components.

ATOS Professional contains Parametric Inspection. All actions and evaluation steps are completely traceable and interlinked, and can be easily modified or adjusted.
GOM Inspect is a free result viewer, mesh processing and inspection software for dimensional analysis of 3D point clouds or ATOS data.

**Free result viewer**

Share ATOS results, further analyze data and easily discuss and detect problematic areas with colleagues, suppliers, and customers for effective collaboration to speed-up decision making processes.

**Free Inspection and Mesh Processing**

GOM Inspect is more than just a viewer. It also contains a complete set of tools for advanced mesh processing and evaluation. This free software not only analyzes ATOS data, but also 3D point clouds from laser scanners, CTs, and other white light scanners.

Import, process, and evaluate in one free software package.
**Technical Data**

ATOS Triple Scan is available in three turn-key variations. Each ATOS Triple Scan variation has two industrial, measuring cameras with up to 12 megapixel resolution.

The complete ATOS Triple Scan package includes the sensor head, image processing computer and ATOS Professional Software.

### Sensor Configurations

<table>
<thead>
<tr>
<th>Camera Pixels</th>
<th>Measuring Area</th>
<th>Point Spacing</th>
<th>Working distance</th>
<th>Measured points per scan</th>
<th>Operating Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATOS II Triple Scan</td>
<td>2 x 5 000 000</td>
<td>38 x 29–2000 x 1500 mm²</td>
<td>0.02–0.79 mm</td>
<td>5 million points</td>
<td>5–40°C, non condensing</td>
</tr>
<tr>
<td>ATOS III Triple Scan</td>
<td>2 x 8 000 000</td>
<td>38 x 29–2000 x 1500 mm²</td>
<td>0.01–0.61 mm</td>
<td>8 million points</td>
<td>5–40°C, non condensing</td>
</tr>
<tr>
<td>ATOS Triple Scan 12M</td>
<td>2 x 12 000 000</td>
<td>170 x 130–850 x 640 mm²</td>
<td>0.04–0.23 mm</td>
<td>12 million points</td>
<td>5–40°C, non condensing</td>
</tr>
</tbody>
</table>

### ATOS Technology Features

- **Triple Scan**: Easy scanning of shiny or dark surfaces and complex parts
- **Blue Light Technology**: Scanning independent of environmental lighting conditions
- **Automation Level 1**: Rotation tables, linear units, tilt and swivel units
- **Automation Level 2**: Robots
- **Fast Scanning Mode**: Yes
- **GOM Touch Probe compatible**: Yes
- **Sensor Controller**: Internal

### Computer Hardware

- **High-End PC**: Yes
- **Notebook operation**: Yes, for increased mobility
- **Variable Workstation**: Standing and sitting working heights
- **Power Supply**: 90–230V AC
- **Cable Length to ATOS**: Light weight cables up to 30 m

### ATOS Professional Software

- **Data Capture**: From ATOS 3D Digitizer
- **CAD Import**: CATIA V4, CATIA V5, PRO/E, NX Unigraphics, IGES, STEP, JT-Open, Parasolid, ...
- **Measurement plan import**: ASCII, CSV, FTA, ...
- **Mesh Processing**: Polygon mesh generation, smoothing, thinning, hole filling, ...
- **3D Analysis**: CAD comparison, GD&T analysis, primitive generation, ...
- **2D Analysis**: 2D section-based analysis
- **Multiple Part Analysis**: Standard, without scripting using Teaching by Doing
- **Reporting**: First article inspection, tables (e.g. VDA), free definable report templates, ...
GOM - Optical Measuring Techniques

GOM is a global industrial manufacturer that develops and produces revolutionary optical measurement solutions and technologies for 3D coordinate measurement and deformation analysis. GOM’s measuring systems are based on digital image processing and are used in product development, quality assurance, material and component testing.

Optical measuring technology and full-field surface measurement systems have become a standard tool within virtually all industries. The data from GOM’s measurement systems are an invaluable tool for quality control in modern product development and production process chains.

Non-contact optical measuring systems for all measurement tasks

In addition to the ATOS 3D Digitizer, GOM also offers:

- **TRITOP**: optical 3D coordinate measuring machine
- **ARAMIS**: optical 3D deformation analysis of materials and components
- **PONTOS**: dynamic non-contact 3D analysis of displacements and deformations
- **ARGUS**: optical forming analysis for sheet metal forming processes

GOM customers (extract)

3B Scientific • Aardmann Features • ABB • ACTech • Adidas • AEG • Air Force Research Labs • Airbus • Alcan • Alcoa • Alfa Laval • Alstom • Altax Scientific • Apache Footwear • Arcelor • Aselsan • Asis • ASUS • Audi • Auto Parts Malaysia • Autodie International • Automotive Lighting • Autopal • Avtozav Balda • Bang & Olufsen • BAM • BASF • Batz • Bayer • Bentley • Bertone • Bertrandt • Blaupunkt • BMW • Boeing • Bombardier • Bosch • Bpplus • Braun • BridgeStone • Bundeskriminalamt • Busch Jäger • Canon • Carcassius • Carsun • China Steel • Ching Luh Shoes • Chrom Alloy • Chrysler • Continental • Corning • DAAZ • Daimler • Delloyd • Delphi • DLR • Dodge • Dräxlmaier • DuPont • ETH Zürich • E.ON • EADS • EDAG • Eco • Elasis • ELBAR SULZER • Electrolux • Embraco • Endo manufacturing • Ensam • EPFL Lausanne • ESA • Eurocopter • Ever Tech Plastic • EXXON • FAA • Fachhochschule Nordwestschweiz • Faurecia • FES • Fiat • First Automobile Group • FisherPrice • Flextronics Plastics Technology • FOI • Ford • Forschungszentrum Karlsruhe • Foxconn • Fraunhofer • Fuji • GE Energy • General Motors • Georg Fischer • Gillette • Gintic • GKSS Geestacht • Goodrich • Goodyear • Gorbunov Aviation • Greenpoint • HANKOOK • Hansen Transmissions • Head Tyrolia • Heck • Becker • Hella Leuchtsysteme • Hidrostat • Hilti • Hitachi Taga • Honda • Honeywell • Howmet • Hyundai • IAV • IBM • IMA Dresden • Imperial College • IMPO • Institute of Forensic Medicine Berne • International Automotive Research Centre • Intier Automotive • Istanbul Technical University • Isuzu • Italdesign-Giugiaro • IUC • IVM • Jaguar • JAXA • Jhi Soon Auto Metal • John Deere • Johnson Controls • Kautex Textron • Kewpump • Kia • Kitech • Krämer • Grebe • KTH • KU Leuven • Land Rover • Läpple • Laurence Livermore National Laboratories • Lego • LG Electronics • Liebherr • Lockheed Martin • Los Alamos Laboratories • LUK • Luxottica • Magna • Magneti Marelli • Mahle • Mann + Hummel • Matador • Matrici • Mattel • Max Plank Institute • McLaren • Metabages • Michelin • Microsoft • Miele • Mitsubishi • Modernas • Montpetit • Motorola • MTU • Nagasaki Industrial Research Center • NASA • Nautur • Naval Research Lab • NAZA • Nemak • Nikke • Nissan • Nokia • Nokito • Norhop Grumman Systems • Northfield & Nottingham University • Nypro • OLI OH Technik • Olympus • ONERA • Otto Fuchs • PCC Leoben • PCi • Peguform • Phiaro Corp. • Philips • Pierburg Kolbenscheidt • Pietro Rosa • Pilkinson Automotive • Pininfarina • Playworks • Poong Won Che Hwa • Porsche • Pratt & Whitney • PSA • PURAST • Queen Mary College • Reebok • Renault • RIM • Robbie & Berking • Rolls-Royce • RWTH Aachen • Saipa • Salzgitter • Samsung • Sandia National Lab • Sandy • Saturn • Sea Ray Boats • Seat • Shell • Shenyang Aircraft Research Institute • Siemens • Skoda • SKS Coachbuilding • Sncma • Solar Turbines • Solvay • Sony • Sony Ericsson • Standard Profile • Stihl • Stola • Subaru • Sun Microsystems • Suzuki • Tata Motors • Tata Steel • Temsa • Thomasen • Thule • ThyssenKrupp • Tianjin Motor Dies • Tokai Rubber Industries • Topia • Toyota • Triumph • TRW • TU Delft • TU Dresden • TU Eindhoven • TU Graz • TU München • Tubitak Marmara Research Center • Turbine Services • Tyco • Uni Erlangen LFT • Uni Padova • Uni Stuttgart • US Army Research Lab • Valeo • VDO • Vertu • Villeroy & Boch • Voest Alpine Stahl • Voith Siemens • Volk • Volkswagen • Volvo • Vulcan Air • VZLU • WAGo • Walt Disney • Warwick University • Whirlpool • Yamaha • Yulon • ZF Sachs