LS-DYNA Conference 2015

GOM
Precise Industrial
3D Metrology
Changing products

Changing requirements for metrology

Changing products
Changing product development cycles
Changing production technologies
Changing quality demands
GOM – Precise Industrial 3D Metrology

Optical metrology from GOM provides:
- Fast measurement and results
- Clear visualization of measurement reports
- Flexibility for task, location and parts
- Mobile measurement solutions
- Process safety

GOM measuring systems are complementary or used as an alternative to:
- 3D coordinate measuring machines
- Gauges
- Accelerometers and displacement sensors
- Strain gauges
GOM is a technology company

Global industrial partner with over 20 years experience in the development and production of optical 3D metrology solutions

Hardware and Software

3D coordinate measurement

Material and component testing
GOM – Our know-how

Digital image processing
3D coordinate measurement techniques
Quality control
Material parameters
Automation

Customer focus development of precise industrial 3D metrology

Establishing new approaches with GOM technologies in existing processes

Deploy and support these processes worldwide
GOM

Founded in 1990

Private, owner managed company

Development, production and administration in Braunschweig, Germany
GOM – The Owners

Dr. Konstantin Galanulis
Founder of GOM

Sales
Finance
Human Resources

Dr. Detlef Winter
Founder of GOM

Hardware Development
Automation
Production

Dirk Bergmann
Owner of GOM

Software Development
Support
Product Management
GOM Group with 9 companies and branches

Continuous growth to over 350 employees within GOM Group

36 sales and support partners with over 55 offices worldwide

700 employees in worldwide network
Measuring Systems

GOM measuring systems are based on digital image processing
Metrology Systems

ATOS
Full-field
3D Scanning

TRITOP
Mobile
Optical CMM

ARAMIS
Optical
3D Deformation Analysis

ARGUS
Optical
Forming Analysis

PONTOS Live
3D Motion Analysis &
Component Positioning

GOM Inspect
GOM Inspect Professional
ATOS
Full-field 3D Scanning

Non-contact,
full-field 3D metrology

Complete component geometry

Precise 3D coordinates

Deviation to CAD

Shape and dimension analysis

Reporting
ATOS
Full-field 3D Scanning

Applications

Quality control
Reverse Engineering
Rapid prototyping
Manufacturing
Virtual assembly
ATOS ScanBox
Optical 3D measuring machine

Automated full-field 3D metrology

Standardized robotic measurement cell

Fully automated 3D digitizing and inspection

For different component sizes and applications
TRITOP
Mobile Optical CMM

3D coordinates for large objects, deformation analysis and ATOS

Precise 3D coordinates of surface points, sections, primitives, ...

CAD comparison

GD&T

3D displacement and deformation

Bending, torsion, deflection
TRITOP
Mobile Optical KMG

Applications

Quality assurance of large objects

Monitoring of fixtures, gauges, machines

Deformation analysis and testing applications in automotive and aerospace areas

Climate and environmental chambers

Determination of ATOS reference points
ARAMIS
Optical 3D Deformation Analysis

**Full-field and point-based material and component testing**

3D surface coordinates

3D displacement, velocity and acceleration

Surface strains

Strain rates

Buckling
Applications

Determination of material properties (FLC)
Dynamic behavior of components
Component analysis
Structural testing and vibrations
Verification of FE simulations
Real-time control of testing machines
Crash and impact tests
Durability and fatigue studies
NDT (Non Destructive Testing)
ARGUS
Optical Forming Analysis

Forming analysis for sheet metal

Full-field measurement

3D coordinates of component surface

Form change (major and minor strain)

Thickness reduction

Forming Limit Diagram
ARGUS
Optical Forming Analysis

Applications

Detection of critical deformation areas
Solving complex forming problems
Optimization of forming processes
Verification of tools and tool changes
Optimization of numerical simulations
Adaptation of tool parameters

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PONTOS Live
3D Motion Analysis & Component Positioning

Online measurement, positioning and motion analysis of 3D coordinates

Point-based 3D metrology

Live 3D coordinates and displacements

Deformation, velocity and acceleration

Deviation to CAD

Recording of analog signals

Digital data communication with external data loggers from test stands
PONTOS Live
3D Motion Analysis & Component Positioning

Applications

Dynamic component behavior

Performance, durability and reliability tests

Stiffness tests from structures and components

Frequency analysis

Vibration and noise analysis

Structural vibrations

Non Destructive Testing

Positioning of components
GOM Inspect
Evaluation Software for 3D Point Clouds

3D Inspection

CAD and measurement plan import

Alignments and element construction

CAD Comparison

GD&T, trend, SPC, motion and deformation analysis, curve, airfoil and point-based inspection, ...
GOM Inspect
Evaluation Software for 3D Point Clouds

**Mesh Processing**

- Import of point clouds
- Polygonization of point clouds
- Thinning, hole-filling or smoothing meshes, ...

**Viewer**

- For ATOS Professional, TRITOP Professional, GOM Inspect Professional
- 3D viewing & presentation
Industry-specific solutions from a single source
Set standards

Optical metrology has become a standard in the development and production of industrial products

GOM measurement systems are used worldwide in industry, research institutions and universities

Automotive industry  Aerospace industry  Consumer goods industry  Research and universities
GOM – Customers (Extract)

Automotive
Audi, AvtoVaz, Bentley, BMW, Chrysler, Daihatsu Motor, Daimler, Fiat, Ford, GM, Honda, Hyundai, Isuzu, Jaguar, Kia, Land Rover, McLaren, Modenas, NAZA, Nissan, Opel, Porsche, PSA, Renault, Seat, Skoda, Subaru, Suzuki, Tata Motors, Toyota, VW, Volvo, Temsa, ...

Automotive Suppliers
Automotive Lighting, Batz, Bertrandt, Bosch, Bombardier, Bridgestone, Carcoitics, DAAZ, Dräxler, Faurecia, Georg Fischer, Gienanth, Goodyear, Hella, Johnson Controls, Kautex Textron, Michelin, Nothelfer, Pininfarina, Siemens, Thule, ThyssenKrupp, ZF Sachs, ...

Aerospace
Airbus, Air Force Research Labs, Aselsan, Boeing, Cessna, Chrom Alloy, DLR, DNV, EADS, Eurocopter, FAA, FOI, Goodrich, Gorbynov Aviation, Hansen Transmissions, Hydro, IMPO, JAXA, Lockheed Martin, NASA, NLR, Northrop Grumman, ONERA, Vulcan Air, VZLU, ...

Turbines
ABB Turbo systems, Alstom, Aviadvigatele, BTL, Chromalloy, Elbar Sulzer, E.ON, Gorbynov Aviation, Honeywell, Howmet, IMA Dresden, MTU, Pratt & Whitney, Rolls Royce, Salut, Saturn, Siemens PG, Sncma, Solar Turbines, Triumph, Turbine Services, ...

Comsumer Goods
Adidas, Asics, ASUS, Blaupunkt, Bosch, Braun, Ching Luh Shoes, Ecco, FisherPrice, Foxconn, Fuji, Gillette, Greenpoint, Hilti, Lego, LG Electronic Mattel, Microsoft, Motorola, Nautor, Nike, Nokia, Philips, Reebok, Samsung, SANYO, Siemens, Sony, Stihl, Villeroy+Boch, Walt Disney, ...

Material Supplier
ACTech, Alfa Laval, Alcan (Alusuisse), Arcelor, , BASF, Bayer, Corning, DuPont, EXXON, Hydro (VAW), Pierburg Kolbenschmidt, Salzgitter, Shell, Tata Steel, Thyssen Krupp, Thyssen Nirosta, Tokai Rubber Industries, Voest Alpine Stahl, ...

Over 8000 system installations worldwide
GOM – What we stand for

Certified Precision
- GOM systems are certified according to proprietary and public standards (VDI)
- GOM software is certified to NIST and PTB
- GOM metrology solutions automatically monitor their system accuracy
GOM – What we stand for

Certified Precision

Application knowledge and industry know-how

- Support from experienced engineers with understanding of industrial processes
- Systems as well as process- and metrology expertise for solving specific tasks
- Knowledge transfer through training, application workshops and conferences
GOM – What we stand for

Certified Precision

Application knowledge and industry know-how

Proven high-end technology
  · GOM measuring systems are developed for industrial use
  · GOM's solutions are in continuous operation (24/7) in production environments
  · Over 8000 systems worldwide monitor the product quality of our customers
GOM – What we stand for

Certified Precision

Application knowledge and industry know-how

Proven high-end technology

Sustainability
  • Continuous improvement of hardware and software with a long spare part availability
  • Concentration on industrial 3D metrology with a high investment in new developments
GOM – What we stand for

Certified Precision

Application knowledge and industry know-how

Proven high-end technology

Sustainability

Partnership and Customer Care
- Partnership throughout the entire life cycle of measurement solutions
- GOM network enables the global deployment of optical metrology
GOM solutions

GOM solutions simplify complex measurement tasks in product development and production

- Improving product quality and production throughput
- Shortening of development processes
- Improving quality assurance throughout the entire product life cycle

Cost reduction

Improvement of competitiveness
GOM – Precise Industrial 3D Metrology

Thank you for your attention.

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