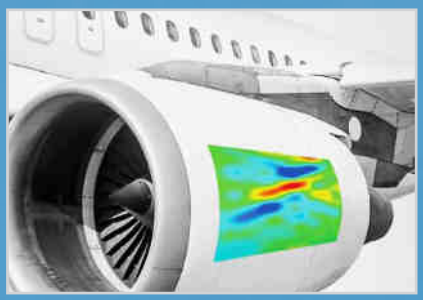
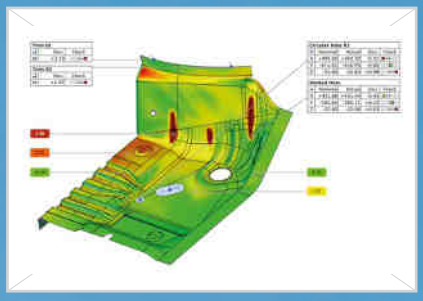
APM Technologies

Since 1999

Experts in 3D Scanning and 3D Printing





ACCURACY, QUALITY & COMMITMENT

gom a ZEISS company | certified partner

3D SYSTEMS Authorized Partner

User Segments:-

- Automotive
- Aerospace
- Defence
- Research & Development Centers
- Moulds & Dies Manufacturing
- White Goods
- And many more ...

APM Technologies started in 1999 with an aim to bring world class technologies to the doorstep of Indian Industry, to meet the challenges of...

- Better Quality
- Faster Development
- Higher Productivity
- Better Safety Standards
- Lower Cost

Since 1999 APM is associated with M/s GOM GmbH, world leader in 3D-Scanning and optical measuring technology

Sales Division sells products of M/s GOM Germany which includes-

- **ATOS - 3D Scanner**
- **TRITOP Photogrammetry**
- **ARAMIS**
- **ARGUS**
- **PONTOS** Live

Services Division offer services of 3D Scanning Quality control, Reverse engineering , RPT, Product Development & Part or CAD verification
Today APM enjoys pioneering & market leading status in the field of 3D- Scanning, Quality control & Reverse Engg. with an experience of scanning over 81000 parts.

APM's facilities include ATOS, TRITOP, ARGUS & ARAMIS systems along with a team of highly skilled and dedicated engineers.
APM has inhouse facility for Reverse Engg. an advanced 3D-CAD workstations. APM has facilities and experience to scan parts ranging from a small coin to an aircraft and almost everything in between. APM offer in-house service as well as on site service for large, heavy, sensitive or confidential parts.

Proud to be associated with :-

Atlas Copco, Autopal, Bajaj, BARC, QP, faurecia, Piem Light up the world, Ford, Force Motors, Ghatge Patil Industries Ltd, GM, Gestamp, Godrej, Honda, Hinduja, Java Hind, JBM Group, John Deere, Lumax, Larsen & Toubro, Maruti Suzuki Way of Life!, Mahindra, Toyota, TEL, Tata Boeing, Tata Motors, Tata Steel, TVS, VW

World leading ATOS family of Blue light scanners and TRITOP Photogrammetry system from GOM GmbH, Germany (www.gom.com) are the cornerstone of APM's vision to make available world's best technology in the field of scanning, product development and quality control. APM offers these products in Indian Market as the authorized sole distributor of GOM.

Industrial High-End 3D Digitizer

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

ATOS 3D Digitizers

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

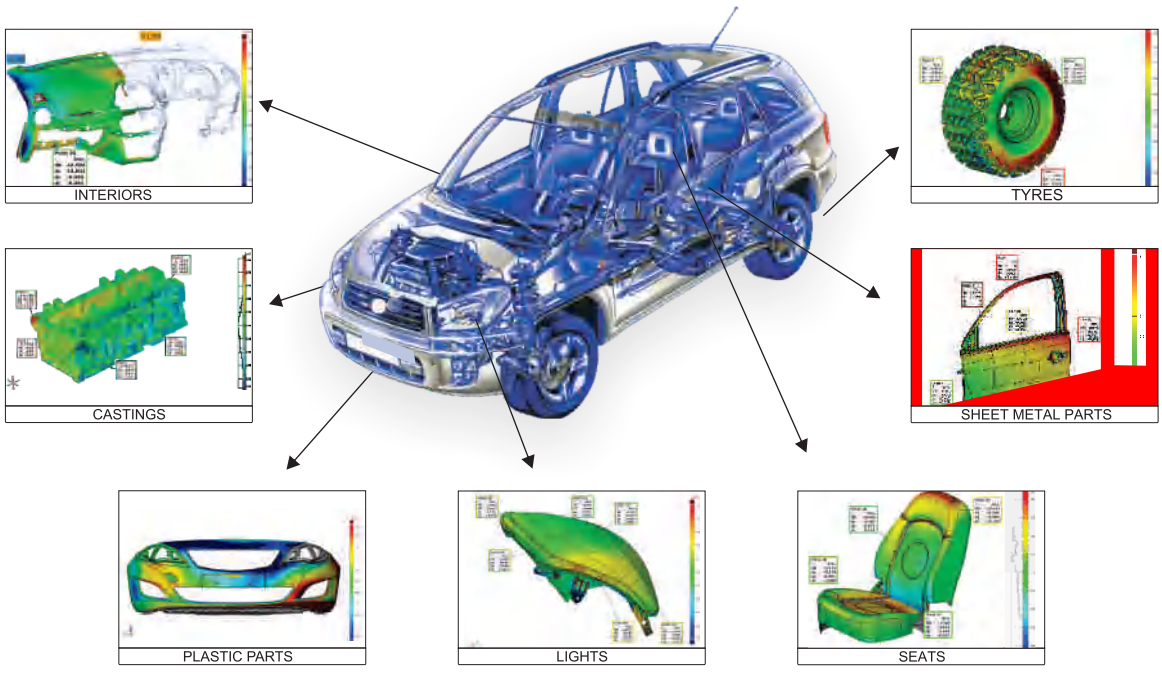
From coins to cars to aeroplanes

ATOS measures different object sizes, materials, 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, Trend Analysis
- Complete measuring reports

Make Parts - First Time Right

ATOS 3D-Blue Light Scanning and Inspection system is a versatile tool to check all major parts and assemblies in an automobile to produce clear, concise and easy to understand graphical reports.



Products offered

GOM Scan 1 Big Idea in small package

Since 1999

Cost effective solution with GOM quality

GOM Scan 1 is here to open up new possibilities. Industrial standards such as GOM fringe projection technology and Blue Light Technology deliver the foundation for detailed and accurate 3D meshes. Meanwhile, the integrated software GOM Inspect helps you apply the mesh to any project you want: 3D printing, reverse engineering or part inspection. So, go ahead and start something big.

A powerful 3D scanner

GOM Scan 1 features a compact shape and robust design filled with advanced technologies.
From GOM's Blue Light Technology to the stereo camera principle, this sensor is built to deliver 3D data with high precision.

Small, mobile and easy to use

The lightweight solution allows you to capture 3D data intuitively. Easy to operate, GOM Scan 1 is the specialist for simple and fast measurements of small to medium-sized parts – even in confined spaces.

Fast and precise

GOM Scan 1 with pre-installed GOM Inspect takes meshesto the next level. You can rely on high quality data, generate precise meshes and get your 3D data easily and fast.

Use the new GOM Scan 1 for

- 3D printing
- Reverse engineering & manufacturing
- Virtual display or 3D models
- Research and education
- Art and heritage
- Design
- Healthcare

Choose your measuring volume

Different applications have different requirements. GOM Scan 1 is available in three versions with the measuring volumes: MV 100, MV 200 and MV 400. With all three sensors you can rely on high-precision measurements for small to medium-sized objects. Sensor can be hot plugged to change MV with 2 minutes.




ATOS Compact Scan

Since 1999

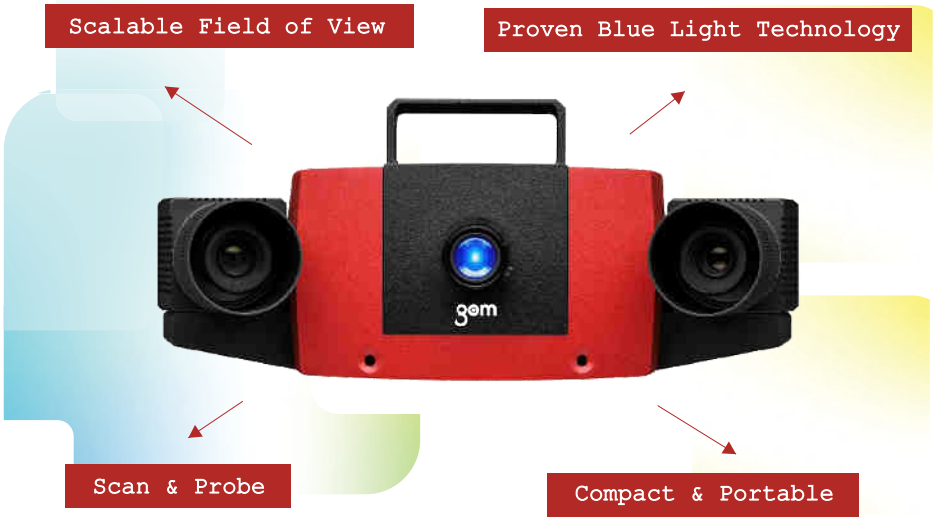
Portable 3D Scanner

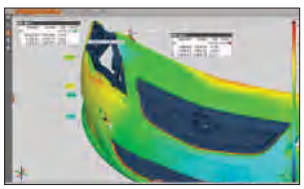
The ATOS Compact Scan is in a class of its own. This modern 3D scanner combines the latest ATOS Blue Light Technology and software into a compact design with an affordable price. Manufactured with high-quality components, this lightweight and compact sensor ensures ultimate adaptability for various applications and environments, especially in narrow and confined areas. Quickly measure castings, design models, forms, injection molded parts, interiors, prototypes, vehicles and much more.

The Compact Class

The ATOS Compact Scan's advanced hardware is integrated with GOM's powerful software for scanning and inspection, making it the ideal solution for 3D applications.

- Blue light Technology
- A complete ready-to-scan system in a compact package
- Fast high definition data and results
- Simple measurement regardless of environment
- Measure various object sizes from small to large
- Quickly measures in narrow and confined spaces
- Complex measurement and inspection tasks
- Easy transport in a single lightweight suitcase
- Extremely fast setup





Scan & Probe

Scanners are limited when measuring deep pockets, holes or optically inaccessible areas. The ATOS Compact Scan solves this by combining ATOS full-field scanning with GOM's Touch Probe Kit.

- ATOS optically tracks GOM Touch Probe
- Instantly change between ATOS and Touch Probe measurements
- Measure unaccessible areas, holes, cavities, and hidden geometries
- Quick measurement of individual points
- Alignment of components, adjustment of fixtures, clearance determination, and more ...

ATOS Q Quality start with a Q

Since 1999

ATOS Q – The new ATOS compact class

In almost all industries, ATOS sensors have established themselves as optical 3D measuring systems. Their success is based on precise optoelectronics, robust sensor design and powerful software. ATOS Q takes this success story further: The sensor perfects the triad of design, technology and performance. The result: a versatile and compact system with real ATOS DNA. ATOS Q is reliable and versatile and therefore perfectly suited for complex measurement and inspection tasks. The compact system meets high metrological demands.

Designed for industry use

ATOS Q delivers fully traceable measurement results even under harsh conditions. The optical and electronic systems of the robust scanner are dustproof and splashproof – making it ideally suited for taking a project from the measuring room to production.

Fast results, exceptional performance

ATOS Q impresses with fast data processing. It enables highspeed fringe projection and delivers high-quality information in reduced measuring time. Industrial ports with fiber optic cables and robust plug-in connections allow for high data throughput

ATOS Design

- Simple operation
- Protected optics
- For industrial use
- Robust, compact sensor
- Traceable results even under harsh conditions
- Use close to production possible
- Blue Light Equalizer

ATOS Q rises to the challenge

The compact ATOS Q sensor is veryversatile. It solves complex measurement and inspection tasks in manual, semiautomated or fully automated operation on the GOM ScanCobot and in the ATOS ScanBox 4105.

Products offered

ATOS 5/5X

Since 1999

High Measuring Speed

ATOS 5 sensor provides full-field 3D coordinates for each individual measurement. Within a few seconds, up to 12 million independent measuring points are captured per scan. This is possible by the low noise level of the Blue Light Equalizer. As a result, the measuring data is characterized by very high detailed reproduction, thereby enabling very small component features to be measured.

Blue Light Equalizer

ATOS 5 is equipped with a Blue Light Equalizer, which increases the brightness of the light source by a factor of 1.5 and transmits uniform, non-coherent, speckle-free light to the projection unit. The Blue Light Equalizer of ATOS 5 is so powerful that even on unconventional surfaces can be scanned in short measuring times and the precise coverage of complex geometries are possible.

Triple Scan Technology

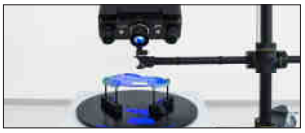
In addition to GOM's stereo camera technique, the ATOS 5 also uses the right and left cameras individually in combination with the projector.This new method results in 3 individual sensors, each with different viewing perspectives of the object.
This new technology enables even higher detailed feature capture with faster measurement times for various part sizes, surfaces, finishes, and geometries, regardless of environmental lighting conditions.

Full Automation with Optical Metrology:

- Increased efficiency in quality control
- Higher throughput
- Higher repeatability
- More comprehensive part inspections
- Major cost reductions
- Accelerated return on investment

ATOS 5 Innovation

- High speed scanning- 0.2 sec per scan
- Blue light equalizer
- Laser light compressor
- Fibre optic connectivity
- Robot precision

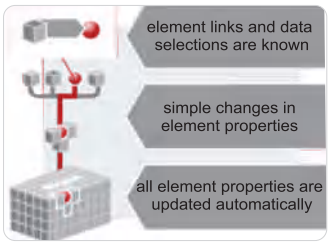


GOM Suite

Since 1999

The new approach of parametric inspection

GOM Inspect Professional is a process-safe, parametric, traceable evaluation software for dimensional analysis of 3D point clouds from white light scanners, laser scanners, CTs and other sources.

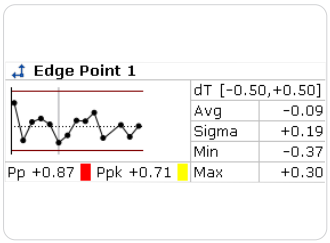


Traceability

GOM Inspect Professional offers deep and comprehensive traceability, from result back to element creation, to increase overall process safety. The exact creation parameters, measurement and point selection of any element are known and can be traced back to origin and checked.

Teaching By Doing

With GOM's Teaching By Doing, all evaluation steps are available without the need for scripting, advanced planning or user intervention. Teaching By Doing reduces programming time to zero. The result is identical workflow for single and multiple part evaluation, saving time and costs.



3D inspection, mesh processing and viewer software

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

Features:

Mesh Processing

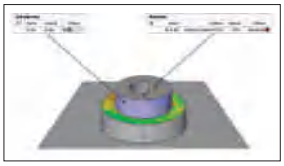
- Import of point clouds
- Polygonize point clouds to meshes
- Smoothing meshes
- Thinning meshes
- Hole filling in meshes
- Refinement of meshes
- Extracting curvature lines from meshes
- Export as STL, ASCII, ...

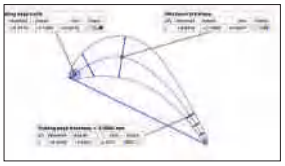
Inspection

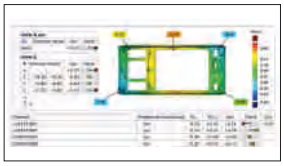
- CAD Import: CATIA PRO/E, UG, IGES,STEP, JT-Open, Parasolid,...
- Measurement plan import: ASCII, CSV, FTA, DMIS...
- Multiple alignments within one project:
- CAD comparison: surface, sections, points, ...
- 2D section-based analysis
- GD&T analysis based on ISO 1101 and ASME Y14.5 standards

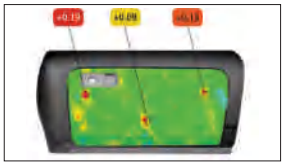
GOM Inspect

- Open ATOS Professional and GOM Inspect Professional data sets
- 3D viewing and presentation
- Optional write protect to prevent changes in GOM Inspect
- Further analysis and inspection Reporting: screenshots, tables, PDFs









ATOS ScanBox
Complete Automated Scanning & Inspection Solutions

The ATOS SCANBOX is a plug-and-play measuring cell for fully automated 3D digitizing and inspection. It combines optimized industrial components, mobility and highest safety in an off-the-shelf 3D measuring machine. ATOS Triple-Scan is mounted on a ROBOT which can be visually programmed for scanning from within ATOS Software.

Series 4

Complete workflow in one software application

ATOS Professional is a process-safe software solution that controls the ATOS SCANBOX, programs the ROBOT offline or online, produces precise 3D surface data, edits and post-processes the data and offers complete inspection and reporting in one software package.

- Monitoring early trend analysis within production processes for multiple parts.
- Establishing root cause analysis to detect engineering issues
- Higher productivity and increased efficiency in quality control
- Quality assurance with fewer personnel and increased performance

Series 5

Series 6

PLUG & PLAY Standardized, automated optical metrology

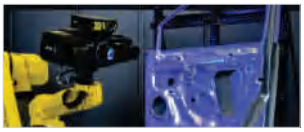
ATOS 3D-Scanner mounted on a ROBOT and parts positioned on a CNC- Rotary table coupled with ATOS Professional software offers complete automated inspection up to generation of reports.

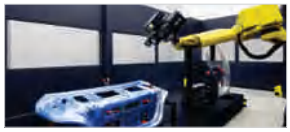
Series 7

Salient Features of ATOS SCANBOX

- Fully Automated inspection workflow.
- Optimized layout with optimized components
- High Safety
- Plug & Play Plus Portable setup
- 1:1 transfer of measurement programs
- Fast delivery time
- Complete solution from one source

Series 8



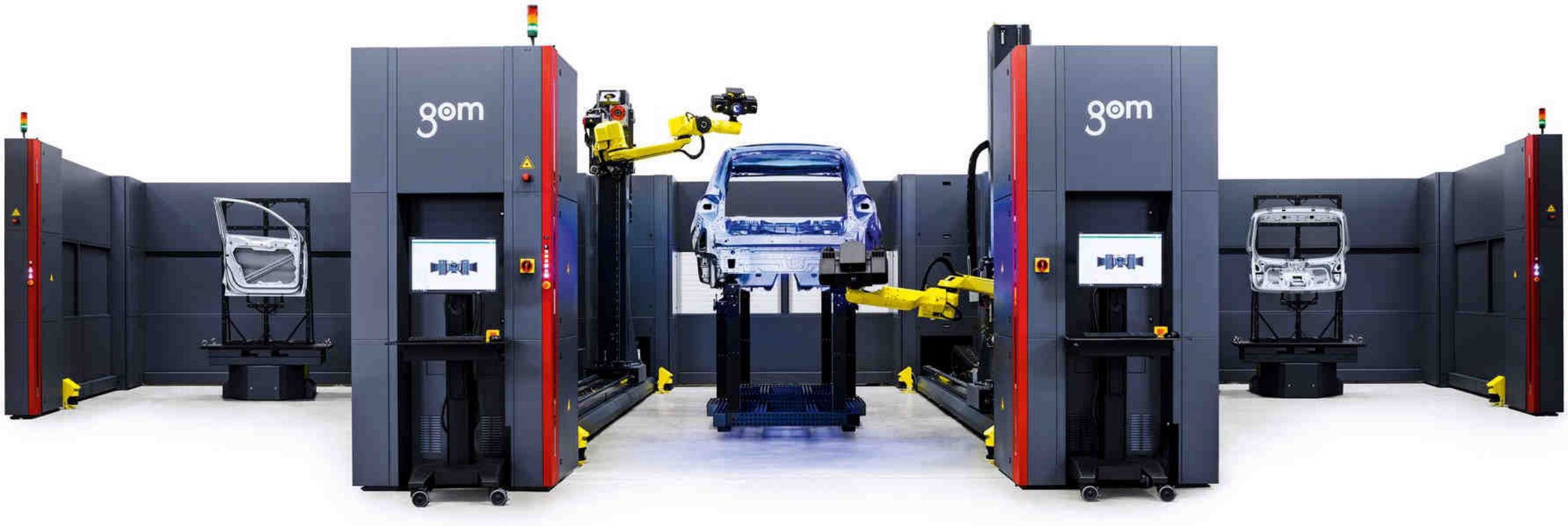
ATOS ScanBox
Complete Automated Scanning & Inspection Solutions

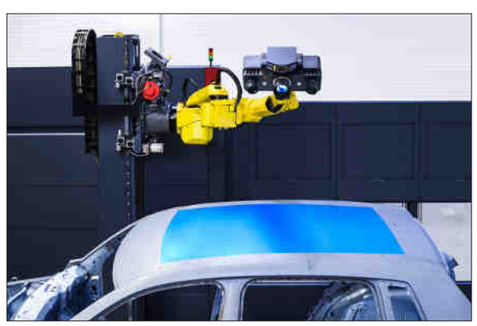
Two-Sided Measurement of Long and Wide Components

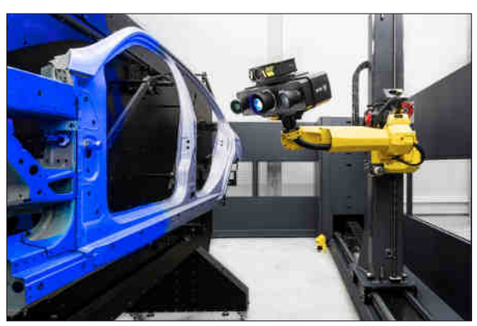
With the ATOS ScanBox Series 8, GOM is offering a measuring system that can measure complete vehicles both outside and inside. The main application areas are analyses in Meisterbuock and Cubing, inspection of complete vehicles and quality control in body manufacturing. Measurements from several components can be merged virtually in order to evaluate information about flush and gaps. Other areas of application include, for example, the scanning of cast blanks, quality control of milled tools and tool maintenance.

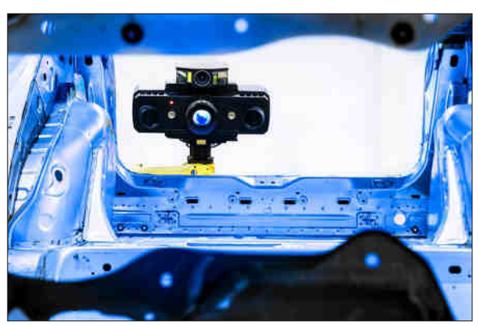
Two 8-axis kinematic systems and sensors in duplex operation – The new GOM 8-axis kinematic concept enables the measurement of complete car bodies from above, below, from the side and inside, while at the same time taking up very little space.

The duplex operation enables a synchronous and coordinated deployment of two robots in one measuring cell. In this process, a joint data set of measurements is created, as the robot operation takes place in a shared coordinate system. Series 8 of the ATOS ScanBox also enables the independent measurement by two robots on two different components.









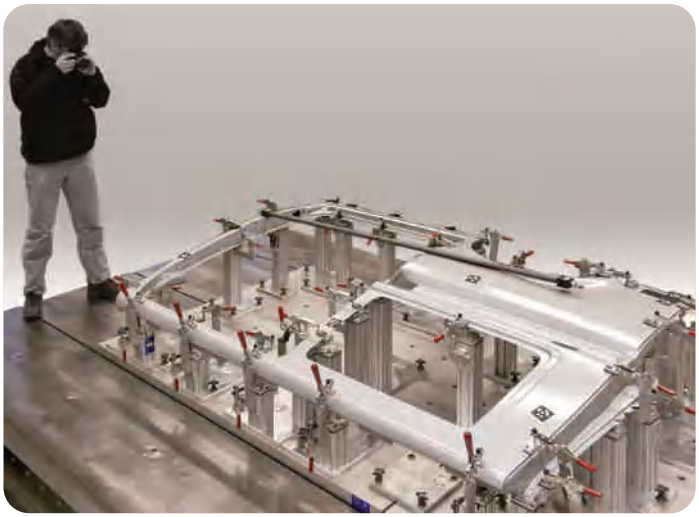
TRITOP - Optical 3D Coordinate Measuring Machine

The portable TRITOP CMM system measures coordinates of three-dimensional objects quickly and precisely. Measuring tasks that traditionally were performed by tactile 3D coordinate measuring machines can now easily be carried out with the TRITOP CMM system. It does not require any complex heavy and maintenance-intensive hardware. The measuring machine comes to the object.
As with tactile coordinate measuring machines TRITOP CMM records the coordinates and their orientation in space for any feature of interest:

- Surface points and sections
- Primitives
- Holes, punch holes and edges
- Diameters, Lengths, Angles.

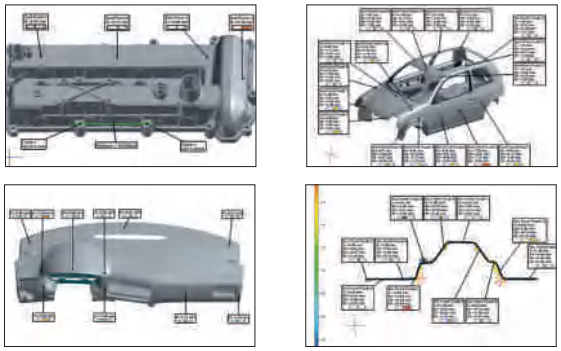
After the 3D coordinates have been determined, the measurement is mathematically transformed into the coordinate system of the component by alignment methods like...

- RPS
- Gage alignment
- Best-fit ...



The measured and aligned data is used for various tasks

- CAD comparison
- Verification of shape and position tolerances
- Verification of specifications from drawings files or tables
- Initial measurements

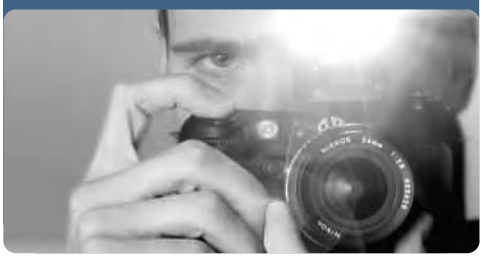


When comparing the measuring data with CAD data (IGES, VDA, STEP, Catia, ProE, UG ...), the corresponding measuring reports are created in the familiar formats:

- False-color representation
- Deviation of individual points as labels
- Sections, angles and distances
- Diameters and flatness
- Table and lists

Advantages of the TRITOP CMM Technique

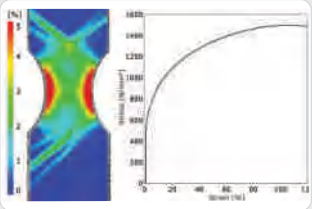
- Complete 3D measuring machine with minimum hardware requirements (2 cases with a total weight of 23 kg)
- The objects are not touched during measurement
- High accuracy for small as well as large objects
- No wear and tear, no decrease of accuracy
- Easy handling
- Independent of environmental conditions (climatic chamber, open air...)



ARAMIS

Since 1999

Optical 3D Deformation Analysis

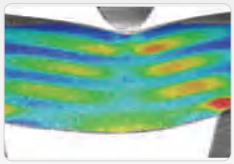


Product development process needs exact determination of material properties, usage of new materials, validation and improvement of FEA calculation.
The deformation measurement system ARAMIS is ideally suited to measure, with high temporal and local resolution as well as a high accuracy, 3D deformation and strain in real components and material specimens.

Results

The results for static or dynamically loaded specimens or components are:

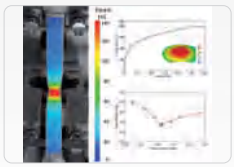
- 3D surface coordinates
- 3D displacements
- 3D speeds and acceleration
- Plane strain rate



The non-contact and material independent ARAMIS system is ideal for many different deformation tasks:

Applications

- Material testing
- Determination of material properties
- Determination of Forming Limit Curves (FLC)
- Verification of numerical simulation



Features

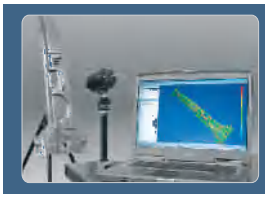
- Objects from 1mm up to 1000 mm can be measured with the same sensor.
- Strain determination in the range of 0.05% up to more than 100%.
- Full-field and graphical representation of the measurement results .
- Mobility and flexibility with a simple and compact measurement system.
- Determination of the forming Limit Curves from standardized measurements.
- 2D and 3D measurements.
- Integrated data logger and triggering device.
- CAD Import for alignment of results
- Comparison of FEA results to measured results
- Measurement at high temperature
- Measurement at ultra high speeds of the order of 1,50,000 Hz

ARGUS

Since 1999

Sheetmetal Formability Measurement

The optimization of the sheet metal forming process, taking into account the correct material selection and the optimization of tools is a decisive factor for competitiveness, particularly in the automotive industry.
The forming analysis system ARGUS supports such optimization processes by generating precise results of the forming distribution on the components. In addition, it provides full-field results for the verification of numerical forming simulations.

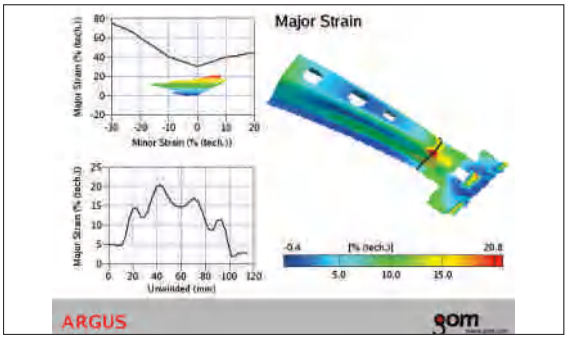


The results from the Argus system provide full-field information about

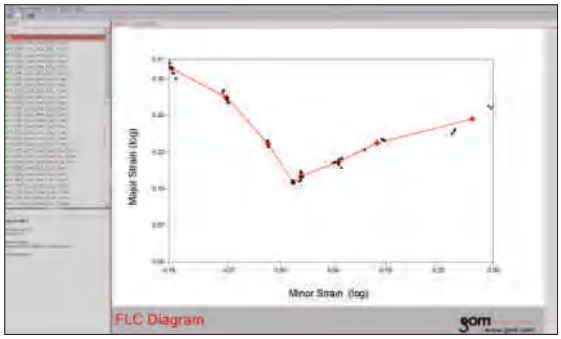
- 3D coordinates of the component's surface
- Form change (major and minor strain)
- Thickness reduction
- Forming Limit Diagram (FLD)
- Sheet metal hardening

Software Features

Possibility to create automated result reports



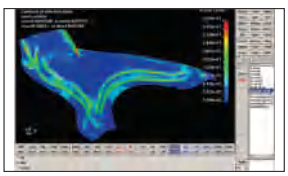
Completely integrated Forming Limit Curve Mode in ARGUS

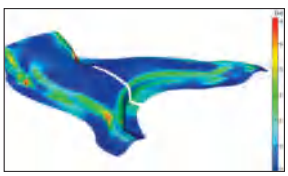


FEA data comparison

Direct comparison of FEA datasets for a full-field data
Surface (geometry), displacements and strains

- Import of FEA Datasets
- ABAQUS (ABAQUS input)
- Autoform (AF)
- LS-DYNA (DYNAIN)
- PAM-STAMP (M01)
- ASCII (for other FE software packages)





Applications

ARGUS provides full-field results with high local resolution for small as well as for large components.
Therefore, it is ideal numerous sheet metal forming tasks like...

- Detection of critical deformation areas
- Solving complex forming problems
- Optimization of forming processes
- Verification and optimization of numerical simulations.

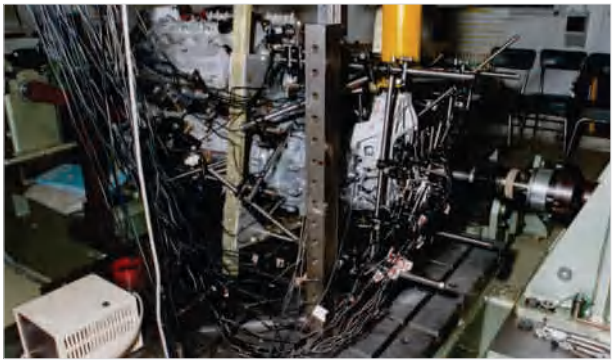
PONTOS Live

Since 1999

Dynamic 3D Analysis

Modern product development demands a better understanding of the dynamic component behavior. This requires an efficient component development in just a few iteration cycles. For the measuring technology to be used, this means that in addition to high absolute accuracies, numerous measuring points and an efficient practical handling are required.
In contrast to conventional displacement measuring system, the PONTOS system reduces the measuring procedure to a fraction of the time. In addition, the understanding of the measuring results is visually supported by an animated representation.

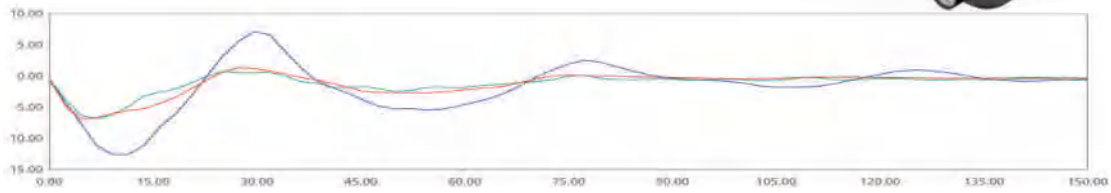
Conventional measuring setup



PONTOS based measuring setup

Results

- 3D Coordinates
- 3D Displacement
- Deformations
- Velocity
- Acceleration



Applications

PONTOS replaces conventional displacement measuring systems and accelerometers. Independent of the structures to be measured, displacements and deformations are captured rapidly in a non-contact manner.

- Door/hood slam
- Dynamic behavior of components
- Component position in windtunnel
- Deformation measurement of aerodynamically loaded structures
- NVH
- Drop tower tests
- Verification of simulations

Features

- Simple specimen preparation
- Ultra-light measurement targets
- Frame rates independent of the number of the captured markers
- Customized triggering of the image acquisition
- Recording of analog signals
- Insensitivity to ambient conditions, such as vibrations and light changes
- Easy adjustment to different measuring areas and tasks

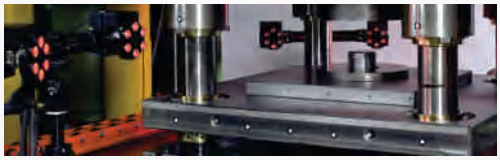


Figure 4 3D SYSTEMS

Since 1999

Manufacturing Redefined

3D System Figure 4 makes 3D production a reality - with increased productivity, durability, repeatability and lower total cost of operations (TCO). Figure 4 delivers productivity enabled through speed and automation with real world repeatable & accurate parts with demonstrated Six Sigma performance in a diverse range of robust, production-grade materials

Fast turnaround

Achieve same day functional prototyping and low volume production for output volumes of up to 500 parts per month, with ultra-high speed up to 100mm/hour.

Easy of use

Figure 4 standalone was designed for ease-of use, and includes file preparation and print management with the powerful 3DS print software, quick and easy material changes with a manual material feed and separate post processing available for curing.

Consistent, high quality output

Powder by non-contact membrane Figure 4 technology, Figure 4 Standalone offers quality and accuracy at six sigma repeatability, with exceptional surface finish and fine feature details. With a compact and easy-to-use design, Figure 4 Standalone delivers industrial-grade durability, service and support with an Advance Service Exchange model and 3D Connect for proactive and preventive support.

Wide range of applications

With Figure 4 Stadalone versatility, you can use the same printer for rapid iteration, functional prototyping, design verification,end-use parts for low volume production and replacement parts, digital texturing application, jewelry casting patterns, rapid tooling of molds, master patterns, jigs and fixtures.

Applications

- Replacement of traditional molding & cast urethane processes
- Rapid functional prototyping & fast concept models
- End-use durable plastic parts
- Low volume bridge manufacturing
- Short run production of plastic articles
- Jigs & Fixtures
- Rapid Tooling - molds and master patterns
- Consumer high temperature applications with transparency
- Elastomeric parts - prototypes of grommets, seals, hoses, weatherstripping, tubes, gaskets, spacers & Vibration dampening components
- Medical applications requiring translucency, sterlization, &/or thermal resistance

Benefits

- Automated solution reduces labour
- Ability to run different part geometries & materials in each print unit
- Scalability enables lower initial system acquisition cost
- Ability to rapidly expand capacity as demand increases
- Layout flexibility
- Six Sigma quality & repeatability
- High throughput & productivity
- Same day print and ship
- Low total cost of operations
- Accelerated time to market vs traditional manufacturing
- Eliminte tooling time & cost
- Efficient design Iteration

Benefits

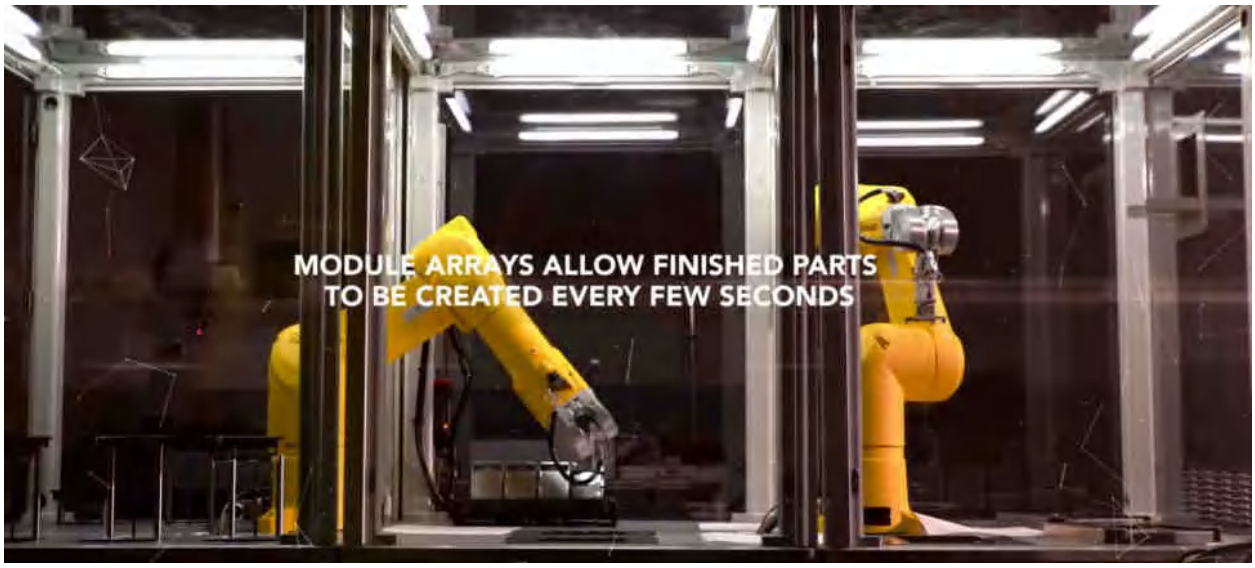
Freeing the production process from the need for tooling means faster production time, greater flexibility and the ability to create multiple products simultaneously.

Specific benefits within the production process includes :

- **No wait time for tooling**: Once the 3D parts design is completed, production can begin immediately. With traditional injection molding, it typically takes weeks to complete the design and manufacturing of tooling.
- **No minimum order quantity:** Paired with the full design flexibility of a digital workflow, the ability to produce parts without tooling makes it possible to delivers parts in any quantity without economic penalty.
- **High-quality, durable materials :** Materials meeting quality requirement for specific applications. Hybrid material formulations demonstrate a wide range of physical properties similar to what is addressed by various themoplastics used in injection molding
- **Eliminates Physical Storage Issues:** Direct production removes storage related issues such as logistics management, warehousing, degradation of parts & molds, lost inventory & time to locate & fetch parts
- **No wait time to change tooling:** Manufacturers can quicky switch geometries for immediate production
- **Fast productions of variety of parts:** Multiple parts geometries can be produced in each builds, or short run parts can be configured as batches, allowing flexible production of multiple part types.
- **Greater part complexity :** 3D printers can produce parts with complex shapes and optimized features that would be impossible to create with traditional injection molding
- **Complements existing production method :** Figure 4 configuration can be integrated onto other shop floor processes & used for Low Rate Initial Production (LRIP) before switching.
- **More efficient part customization** : Parts designs can be customized and then manufactured immediately without the constraint of tooling
- **Scalable with production needs** Systems can be easily scaled by simply adding modules
- **Lower Costs** Direct Digital Prduction reduces labour, machining, iteration & testing costs

Ability to automate & meet Industry 4.0 demands

- Build plate reload
- Part removal
- Part wash
- Material delivery
- Resin recovery
- Monitor
- Cure
- Part verification
- Manufacturing execution system (MES) integration



VARIANTS of the Figure 4

Figure 4 Standalone

Affordable and versatile, for low-volume production and fast prototyping, offering quality and accuracy with industrial-grade durability, service and support.

Prototyping to production

Same day prototyping and direct digital production of tens and hundreds of parts per month.

Figure 4 Intro Video

Figure 4 Modular

Revolutionizing manufacturing

Scalable, semi-automated 3D manufacturing solution designed to grow with your prototyping and production needs. Enabling companies to move directly into production from digital CAD files to delivering final parts immediately.

Speed and versatility

Same-day prototyping and direct 3D production up to 10000 parts per month. In addition, each printer can run different materials and different jobs as part of a single high throughput line serving a multitude of parts being produced.

Figure 4 Modular

Figure 4 Assembly line

Figure 4 Production

Manufacturing at scale

Produce 1 million+ parts per year in a broad range of industrial, dental and custom materials.

Flexible to fit your needs

Combine the design flexibility of additive manufacturing in configurable, in-line production cells to deliver a customizable and automated direct 3D production solution.

Figure 4 has a wide variety of materials that are suitable for every industry. Changing materials is as easy as replacing the build tray with the new material.
Proprietary 3D Sprint software makes communication between hardware and software a breeze with optimal settings for each material applied automatically.

A few materials from the vast library of exotic materials for the FIGURE 4 :

Figure 4 Hi TEMP 300-AMB
High Temperature resistant translucent plastic with HDT over 300°C

Figure 4 EGGSHELL-AMB 10
Process-optimized material for sacrificial tooling to cast silicone

Figure 4 FLEX-BLK 20
Flexible and durable, production polypropylene-like material

Figure 4 Tough 65C Black
Material for long-term use parts with a good combination of impact strength, elongation and tensile strength

Figure 4 PRO-BLK 10
Production-grade, rigid materials for production parts

Figure 4 Standalone Materials

Figure 4 RUBBER-65A BLK
Mid strength production-grade rubber material

Figure 4 RUBBER-BLK 10
Durable, hard rubber like material

Figure 4 MED-AMB 10
Rigid, translucent material that can be sterilized and tested at high temp.

Figure 4 Tough 60C White
White plastic for long-term use parts with a good combination of impact strength, elongation and tensile strength

Figure 4 Rigid 140C Black
Rigid heat-resistant material combining high strength and high elongation for tools-less directs plastic production

Figure 4 High Temp 150°C FR
UI94 V0 rated flame-retardant black plastic with >150°C heat deflection temperature

3D-Scanning & Photogrammetry

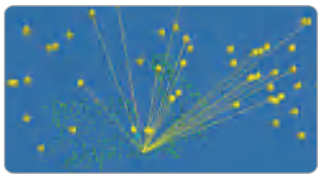
Since 1999

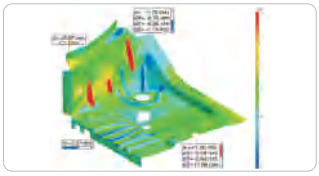
APM Offers high quality 3D scanning services for a wide variety of applications and needs.
The results of scanning can be offered as copious point cloud data or orderly sections along principal planes or parallel to any user defined plane. Point cloud can also be given as tessellated STL file. The point cloud data generated can be reliably read into all industry standard CAD packages for further processing.-
The scan data can be used for –

- Product development
- Reverse Engineering
- Quality Control
- Part inspection by CAD comparison
- Rapid Prototyping
- Digital mock-up - DMU
- Die replication & repair
- Input for FEA
- Packaging
- Milling/Engraving on Scan data parts
- Product life extension
- CAD Verification
- Tooling Management
- Design modification

APM uses World's finest 3D-Scanner ATOS & TRITOP Photogrammetry system from GOM GmbH Germany. Our world class equipment enable us to handle wide range of parts having-

Size - 1mm up to 100,000mm.(100 meters)
Material - Metal, Plastic, glass, foam, thermocole, rubber, wood, resin etc.
Application - Sheetmetal, injection moulded parts, casting, forgings, moulds & dies, blades etc.





Rapid Prototyping

Rapid prototypes are physical samples created by generative or additive manufacturing process rather than normal subtractive or material removal process.
These prototypes aid in

- Design Verification
- Design Validation
- Visualization
- Form-Fit testing
- Functional testing
- Assembly analysis

Depending on user needs APM offers to make rapid prototype models in wide range of materials.
Dictated by user needs APM carries out dimensional testing of the prototypes and deliver Accuracy Certified Prototypes.

APM offers rapid prototyping solution for jewellery industry.

- A new era of technology has begun to enhance your experience of jewellery design and manufacturing.
- The artistic experience and creation efforts can be leveraged to a new level with the help of 3D digitizing and printing technology.
- High quality 3D scanning of jewellery Items, Coins, Medals, antique piece, statue etc.
- Rapid prototyping (3D Printing) of jewellery items, statues, coins etc. with layer thickness upto 16 Microns.

Quality Control and Inspection

Since 1999

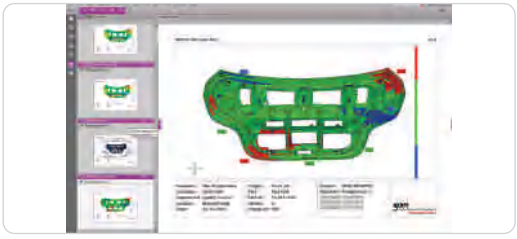
APM offers extensive inspection service for a wide variety of parts. In case of conventional methods, inspection of free form surface/profile is either tedious or not possible. For such parts, scanning & comparison of CAD to scan-data offers a valid solution.

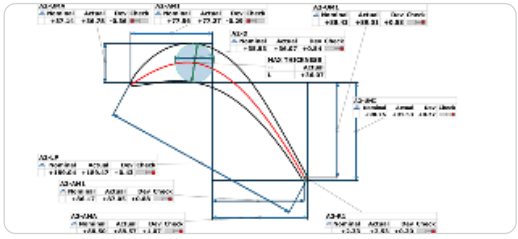
The results are presented as:-

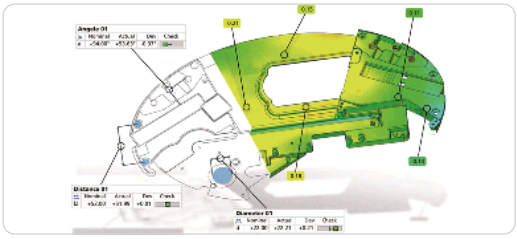
- Rainbow Plot
- Go, No-Go Plot
- 5 Color deviation Plot
- Sectional Needle plot
- GD & T Inspection
- Deviation of individual points as labels
- Tabular report

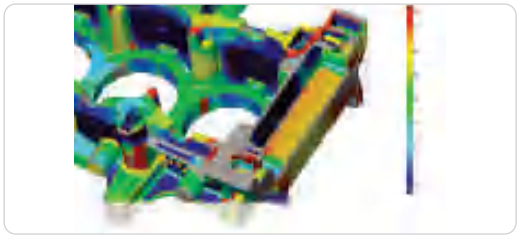
Clear & concise report helps to take decision regarding corrective action.
Alignment of scan data can be based on

- RPS Alignment
- Best Fit
- Best fit of selected areas
- PLP Alignment
- 3 - 2 - 1 Alignment
- GD & T







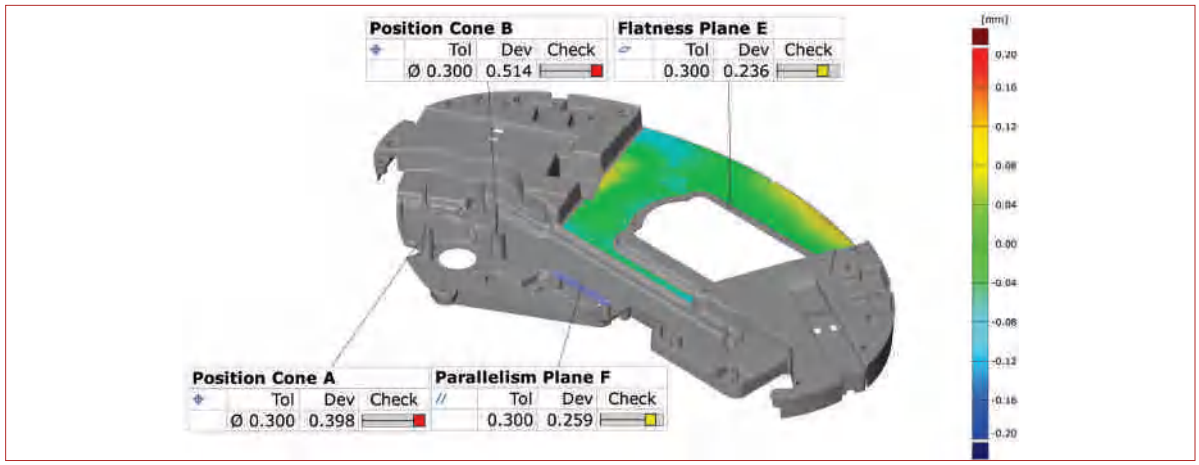


Inspection reports are delivered as printable images in PDF file as well as 3D-report session which can be viewed and analysed in GOM Inspect Software.

GD & T Analysis

Parts manufactured in a shop must meet specific design requirements shown on engineering drawings. GD & T is a way of specifying engineering design and drawing requirements with particular attention to actual function and relationship of the part features.

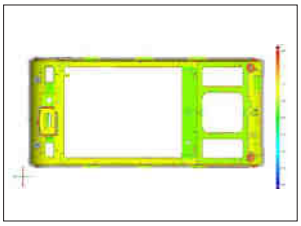
ATOS system can inspect GD & T parameters like Flatness, Straightness, Circularity, Cylindricity, Sphericity, Perpendicularly, Angularity, Symmetry Position, Profile etc..



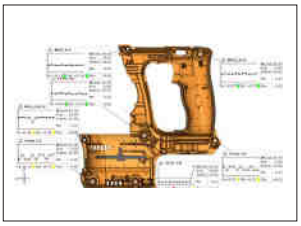
Q-Pro

Since 1999

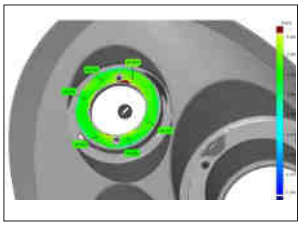
Standard reports are for inspection
Q-Pro reports are for analysis



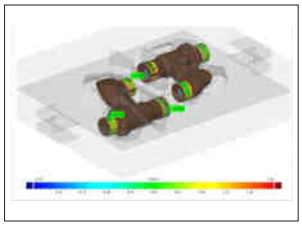
Material Thickness Analysis



Trend Analysis



GD&T Analysis



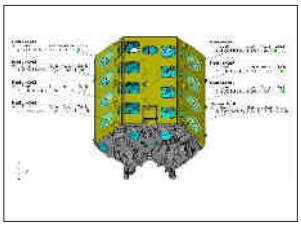
Virtual Assembly

Q-Pro Reports

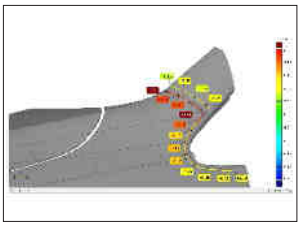
Q-Pro reports are detailed inspection reports which explain more than a deviation color plot. Standard reports offers only color plot of part deviation w.r.t CAD. CAD is now a necessity in component development and the practice of achieving prototypes close to CAD requires same level of inspection as well. We are taking inspection to next level through thorough analysis of components by analyzing micro to macro features and parameters which may affect the quality, performance and productivity.

Q-Pro reports consists following analysis tools

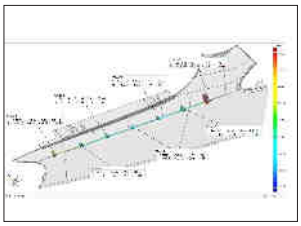
- User defined reports.
- Curve analysis.
- Material thickness analysis.
- Analysis of assembly of parts.
- GD&T analysis.
- User defined reports for R&D activities.
- Statistical reports.
- Process Analysis
- Flush & Gap analysis.
- Airfoil profile analysis.
- CSV analysis.
- Hole position analysis.
- Bending zone analysis.
- Fitting and trimming zone analysis.
- Spring back analysis.
- Character Line/ Feature Line/ Tornado line analysis.
- Warpage analysis.
- Analysis of surface defects.
- Statistical analysis of samples and error pattern.
- Machining allowance optimization.



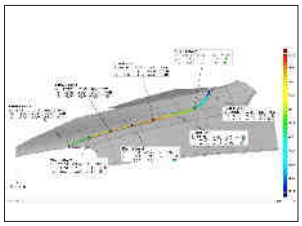
GD & T Position



Curve Based Analysis



Character Line Analysis

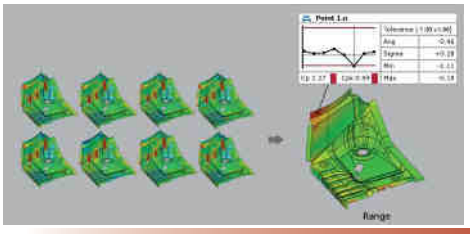


. Flush & Gap Analysis

Trend Analysis

With the trend module, we have an additional tool for full-field analysis of measuring series for multiple parts. In ATOS Professional 'n' number of measurements can be compared not only to the CAD data set, but also to another reference component, e.g. to first article component. ATOS has unique feature of full field analysis of P_p & P_{pk} results, C_p & C_{pk} results, arithmetic mean & standard deviation of 'n' jobs.

With this advanced software- using the table, statistical results for each inspection element can be analyzed individually. In addition, charts can be displayed, which allows a quick visual trend analysis. These results can be exported to existing statistical program.



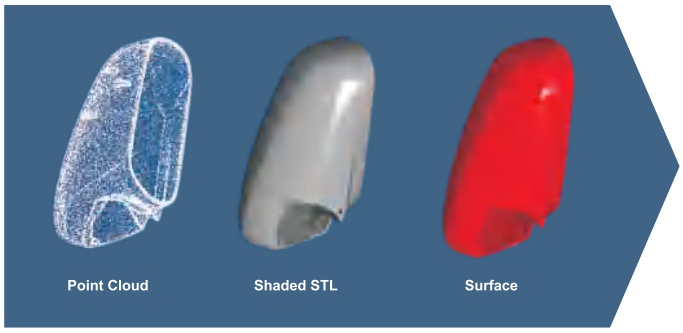
Reverse Engineering

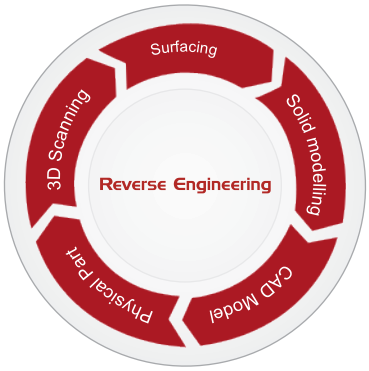
Since 1999

One window Reverse Engineering Services encompassing

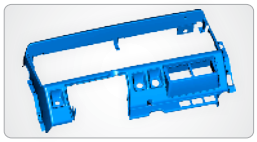
- 3D Scanning and Photogrammetry
- Surfacing
- Solid Modelling
- Core-Cavity generation

The output can be offered as a native CAD files of Ideas, Unigraphics, ProE, Catia or neutral format like IGES, Parasolid, VDA or STEP.





Surfacing and Solid modelling



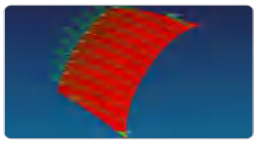
Surfacing is a process of fitting surface entity to a cloud of points ensuring specified geometric tolerances.

Surfacing is required in order to use the scan data for machining smooth surfaces mainly for die/mould production, analysis, digital mockups or packaging purposes.

A highly qualified and skilled team of Engineers at APM regularly carry out surfacing and solid modeling activity after 3D-Scanning of the physical part.

In addition to multiple licences of Imageware surfacing software APM has in-house software licenses and expertise in Unigraphics-NX, Ideas and ProE-Creo and Catia.

Class A Surfacing



Class-A surfacing needs a fine blend of keen visualization skills, artistic insight engineering and mathematical expertise

At APM we have a team capable of delivering on tough exacting class 'A' surfacing requirements usually for visual and artistic parts, including automotive exteriors. The surface so produced passes stringent quality checks, an epitome of digital art.

Product Development

APM Offers to create parts based on concept, geometrical and dimensional product brief. Inputs vary widely from rough concept to existing working part, needs vary from new parts development to life extension program, simple refurbishment or a facelift. In all cases a vital requirement today is to deliver the prototype in digital form. This is where APM offers CONCEPT to CAD.

A physical prototype is created after a design concept is finalized based on renderings and then it is converted to CAD through the process of Reverse Engineering.

DIRECTION MAP

APM

Since 1999

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