



Advanced Production Systems

Precision Measurement Solutions for Process Control

Rich History of Innovation

OGP® (Optical Gaging Products) is a division of Quality Vision International Inc (QVI®), a world-leading manufacturer of precision multisensor metrology systems for industrial quality control.

OGP's systems extend beyond the famous SmartScope® product family, including TurnCheck™ Shaft Measurement Systems, c-vision™ Video Contour Projectors®, and ShapeGrabber® 3D Laser Scanning Systems.

VIEW™ Micro-Metrology pioneered high-speed dimensional measurement with the world's first vision CMM system in 1976. VIEW was acquired by QVI in the year 2000. Today, select VIEW products in North America and Europe are branded and sold by OGP - and the focus on high-productivity multisensor measurement continues on.

The Multisensor Advantage

OGP Multisensor metrology systems offer significant advantages in measurement speed and accuracy. By using the best type of sensor for individual dimensions, multisensor systems measure parts faster, more thoroughly, and more accurately.

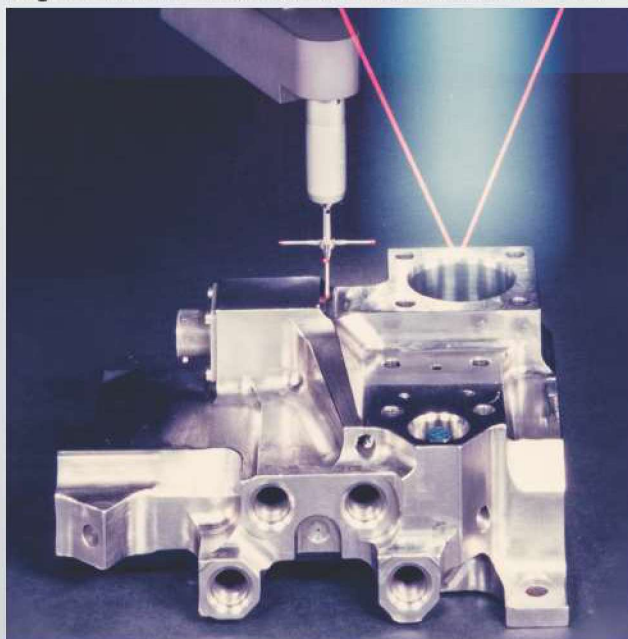
OGP pioneered multisensor measurement, introducing the IQ-2000 multisensor system with vision, touch probe, and laser sensors in 1986. Since then, OGP has consistently led the industry with a succession of innovative systems and sensors to tackle the most difficult measurement challenges.

OGP SmartScope systems are designed as multisensor systems from the ground up. All sensors are integrated seamlessly with the system mechanics and software, simultaneously calibrated, and available for use at any step in the measurement routine.



In 1986, OGP introduced the world's first multisensor coordinate machine

OGP Established the Multisensor Measurement Systems Segment with the Introduction of the IQ-2000 in 1986



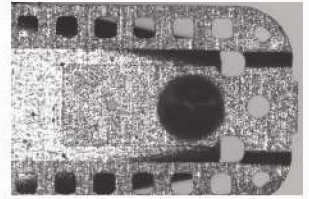
OGP has been featured in *Quality Magazine* for 40+ Years



The Multisensor Lineup

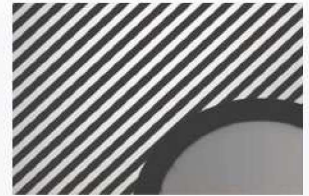
Video Sensors

Fast, non-contact video measurement provides high accuracy and repeatability for defined dimensions. OGP Metrology Software offers a wide variety of image analysis tools for feature detection, part orientation, and measurement for edges and surfaces.



Grid Projector

Systems are designed so the surface of the part can be in focus when the projected grid pattern is in focus. Mirror-polished and transparent parts have no surface structure to bring into focus. Grid Projector projects a contrast pattern on reflective surfaces for easy, accurate focus – even more on mirror-polished metal.



Touch Probe (TP20/TP200)

Touch Probes measure areas that are inaccessible to optics, extending the measurement versatility of the system. A touch trigger probe measures features that are difficult to image or surface. To increase versatility of a measurement system, add a 2, 4, or 6 position change rack to hold the most used probes.



Scanning Probe (SP25M)

Add continuous contact scanning capability with the SP25M scanning probe. Easy to use, simply select a start and endpoint and the scanning probe follows the part profile between those points. Both programming and measurement times are greatly reduced compared to single point probing. Add a 3 or 6 port change rack for automated changing of scanning modules and stylus holders.



Through-the-Lens Lasers

Through-the-Lens Lasers offer a non-contact method for measuring surfaces, using point focus for single-point measurements or scanning for multi-point measurements.



Rainbow Probe™

Rainbow Probe easily measures transparent, translucent, fragile, liquid, or easily deformable surfaces and are mounted in mechanical deployment mechanisms so they can be retracted when not in use.



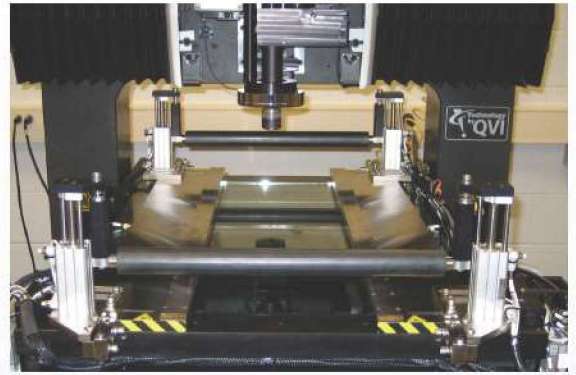
Rotary Indexers (4th & 5th Axis)

Symmetric parts and parts with important features on many sides can be fully characterized with a rotary indexer. Available with different capacities and resolutions, rotaries allow complete measurement in a single setup. Dual-axis rotaries, comprised of two rotaries mounted together, provide full 5-axis capabilities.

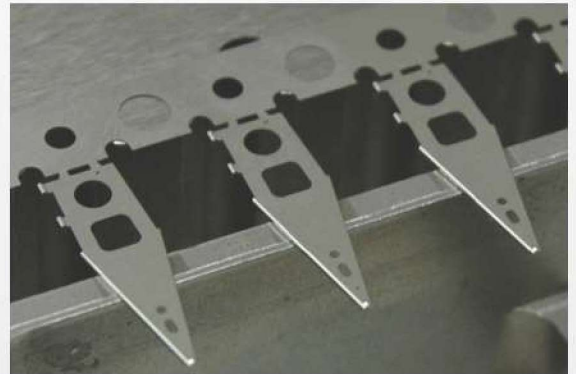
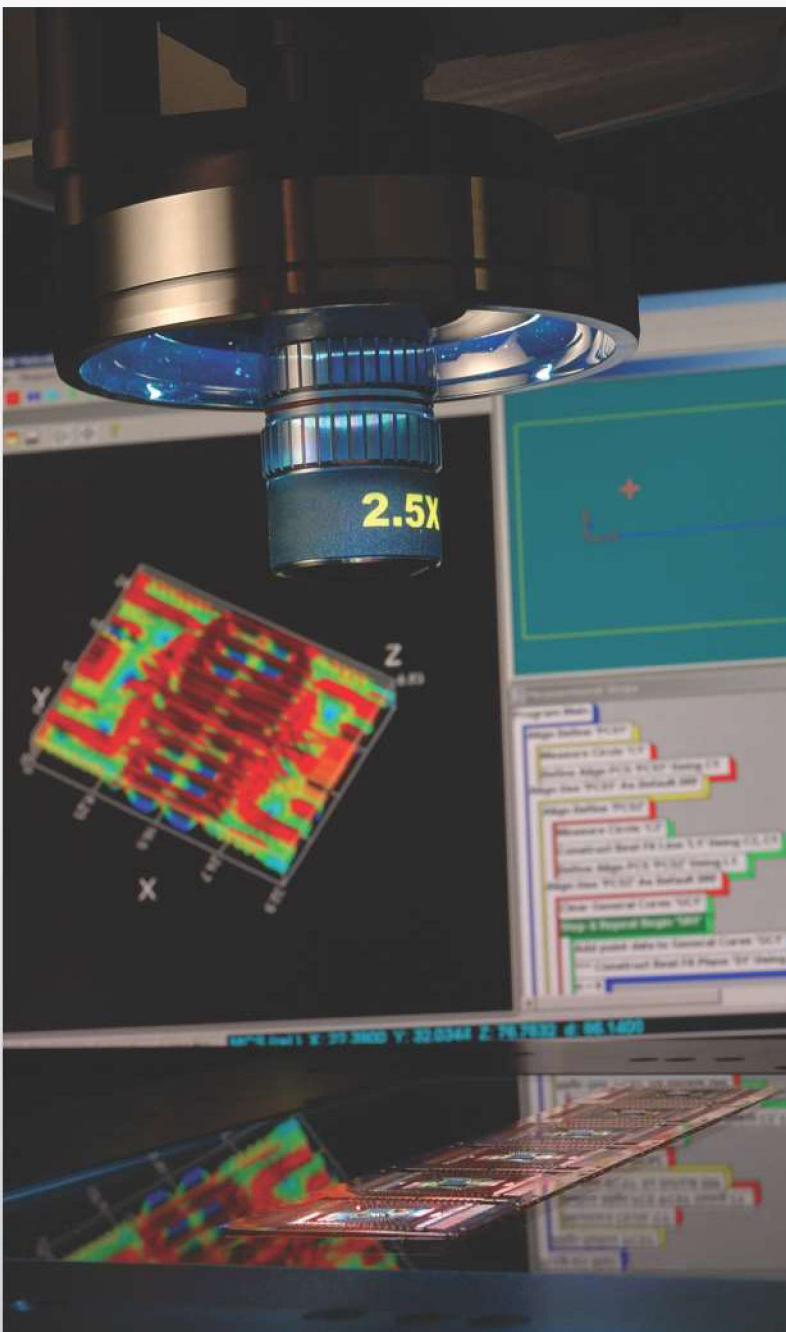


Superior Technology with Experience with Industrial Processes

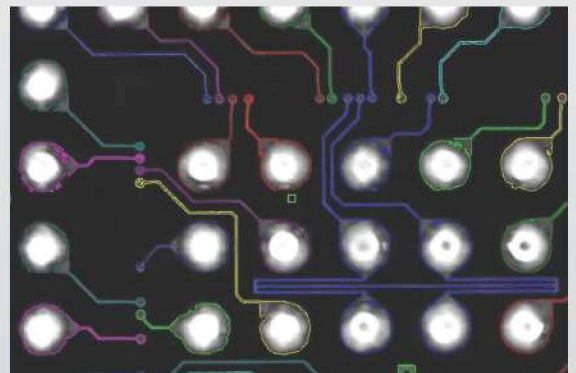
OGP Advanced Production Systems are used to monitor and control industrial processes where high accuracy for critical dimensions and component positioning are required. These systems offer a unique blend of optical configurations, software, fixture tooling, and application programming to create turnkey solution for the most demanding manufacturing challenges.



OGP Advanced Production Systems specialize in matching high productivity measurement platforms with application-specific sensors, tooling, and software – from simple part holding fixtures, to automatic material conveyors, to factory floor operator interfaces.



With the capability and precision to measure critical micromachined components used in consumer electronics and computers, OGP Advanced Production Systems are used for process control on more than 80% of the Hard Disk Drive (HDD) suspensions manufactured worldwide.



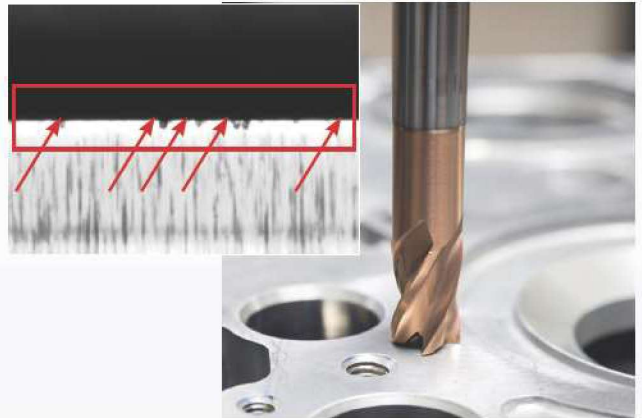
OGP Advanced Production Systems do more than simply measure dimensions. The image processing technology in these systems identify and characterize defects – from scratches and digs in optics to shorts or opens in micro-flex circuits.

High Precision Applications

Precision Micro-Grinding

OGP Advanced Production Systems provide dimensional characterization of defects in precision cutting tools. High resolution optics and flexible software allow summing of total incursion area per unit length, or conventional tolerancing of individual defect sizes, enabling quality control for individual parts and feedback to the CNC program to account for tool wear and machine drift.

Application: Blade Edge Damage – measurement of length and depth of edge defects on cutting surfaces.

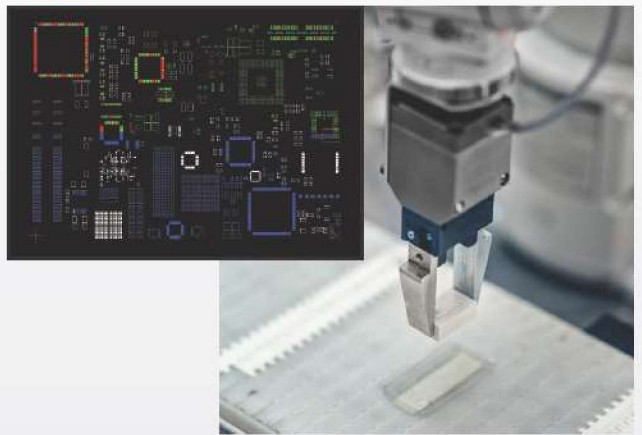


Electronic Assembly Calibration and Monitoring

Elements® software provides the optimum capability for measuring complex electronic assemblies. Direct CAD-to-measure programming and rule-based programming allow routines to be set up in minutes. Elements quickly measures and compares feature data to the CAD file for rapid process control feedback right on the manufacturing floor.

Application: Stencil Validation – rapid measurement of position, size, and rotation of thousands of apertures.

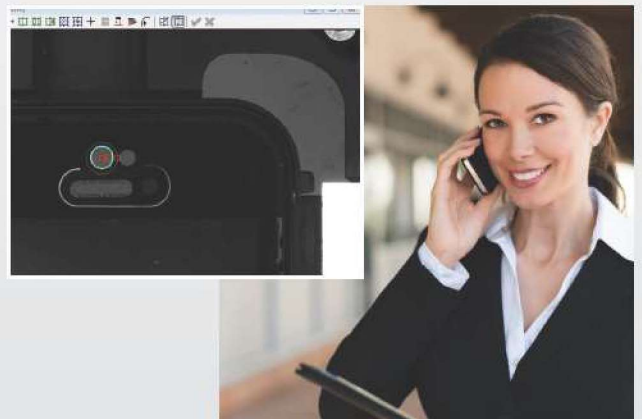
Application: Robotic Placement System Calibration – measure the location of components placed on a sample coupon to determine positioning offsets for each placement head.



Mobile Phone, Tablet, and Wearable Assembly

Automated assembly of handheld devices places a premium on control of critical dimensions that determine the reliable function and sleek feeling consumers expect. The combination of materials such as glass, plastic, and lightweight alloys in a factory floor environment presents unique challenges for the measurement tools. OGP Benchmark™ systems offer the rugged stability and precision needed to successfully measure tight assembly tolerances.

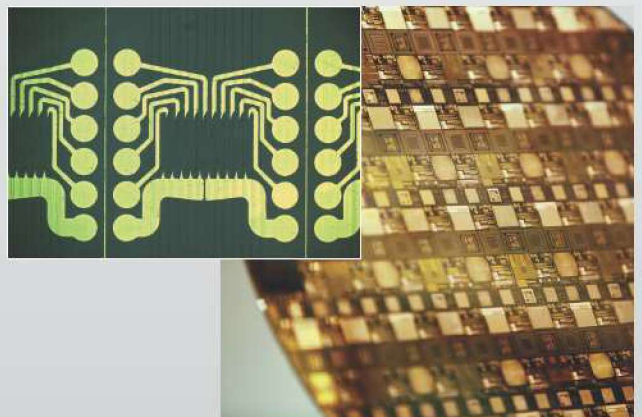
Application: Mobile Handset Assembly – shop-floor measurement of feature sizes and locations on smartphone cases.



Photolithography & MEMs Fabrication

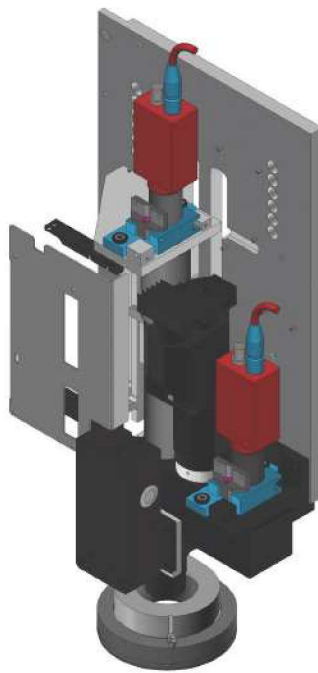
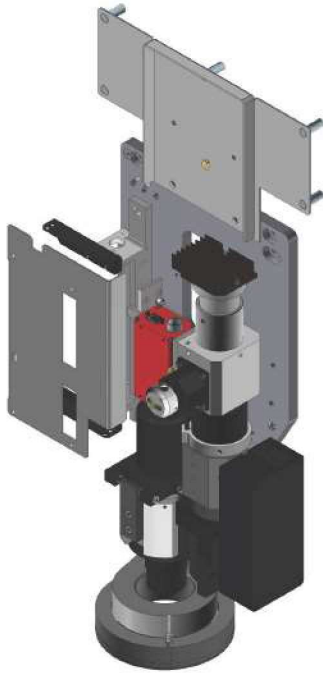
Few manufacturing processes place greater emphasis on precision process control than integrated circuit fabrication. OGP Advanced Production Systems offer high performance tools for wafer and photo level CD measurements for wafer-based displays, MEMs, and III-V devices. OGP Advanced Production Systems provide extended measurement range and speed for larger display devices with large numbers of features.

Application: Touchscreen Display – measurement of size and location of over 100,000 features on a 200 mm wafer. Location patterns change frequently, requiring 100% CAD-based programming and intelligent finder optimization.



Optical Technologies

OGP Advanced Production Systems high-performance optics match optical characteristics with feature sizes and throughput requirements. Four unique illumination sources - Through the Lens, Backlight, Programmable Ring Light, and Grid Projection - each designed specifically for the optical system, provide flexibility to measure a wide range of feature types and material characteristics.

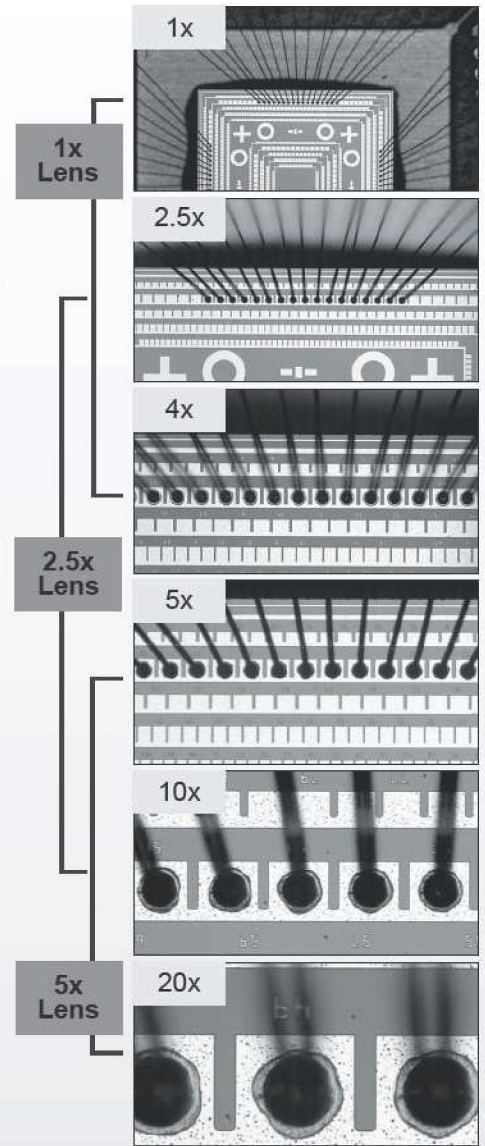


Single Magnification Optics

The single magnification optics system offers an optical resolution that supports up to a 5.0 megapixel digital camera with the standard objective lenses. This system is ideal for high-speed measurement of parts with many similar features, for which a single magnification is sufficient.

Dual Magnification Optics

The dual magnification optical system consists of two distinct optical paths, each with its own camera. Magnification change is instantaneous, with no moving parts, no latency, and no need to recalibrate. Dual magnification systems offer the convenience of a large field of view for locating features, and a high magnification for autofocus and small feature measurement.



Match Magnification to Feature Size

Interchangeable objective lenses allow optical resolution and field of view size to be optimized for the application. For dual magnification systems, the internal magnifications are 1X and 4X multiples of the objective lens magnification.



Metrology Software

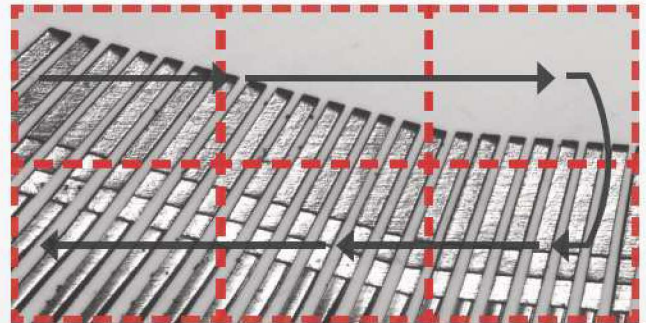
Metrology software is the way users interact with OGP measurement systems. Controlling, monitoring, displaying, and reporting every aspect of the measuring process. OGP software lets you do as little or as much as you need - from part to part, operation to operation. Extensive sets of automatic tools provide greater capabilities and consistent results 24/7. OGP offers VMS, Elements, ZONE3 and Measure-X as metrology software choices for our OGP Advanced Production Systems.

VMS Metrology Software

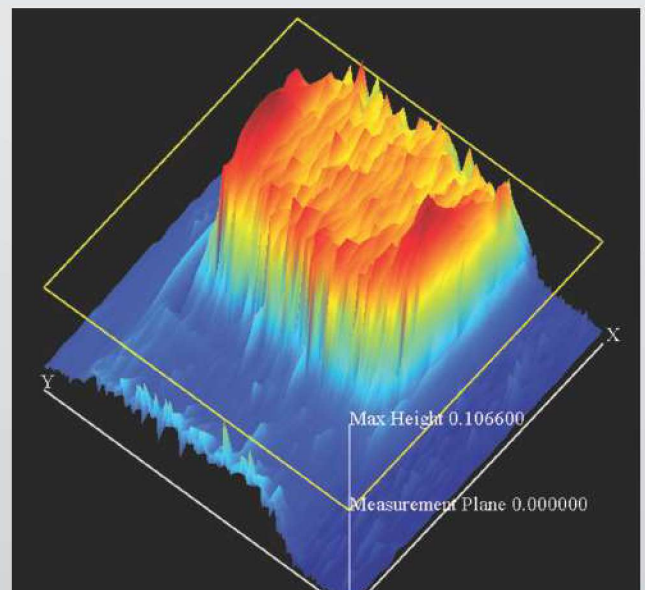
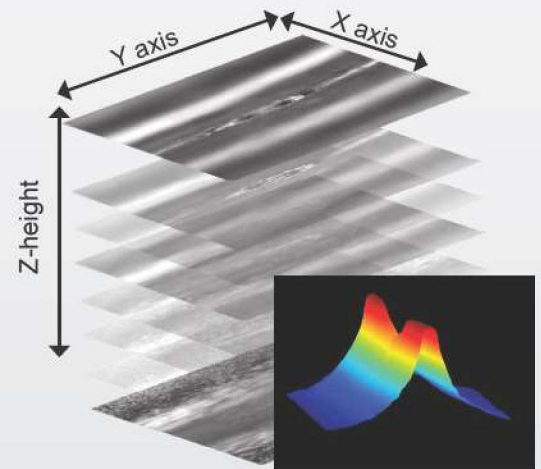
- VMS Edge offers unparalleled flexibility to identify precise edge locations from within a complex scene
- Blob and Centroid enable flaw detection and feature presence or absence checking, in addition to dimensional measurements and feature centering
- Area Multi-Focus (AMF) creates a high resolution 3D data set from a normal autofocus pass, offering a high throughput alternative to laser surface scanning
- Extended Depth of Field Imaging (EDFI) is also done through a normal autofocus pass. This creates a 2D image from a 3D part where all surfaces throughout the pass are in focus
- Continuous Image Capture (CIC) synchronizes illumination with camera frame acquisition and stage movement to acquire video images while XY stages are in motion
- Image filters for erosion, dilation, smoothing, and contrast provide reliable and accurate edge processing
- Native Video® processing capability allows saved images to be measured using the same analysis tools as live images
- Defects and anomalies can be detected on a part based on size, shape, or color. These defects can be classified to determine whether a part has failed based on pre-defined criteria.

OGP Advanced Production Systems pioneering work in digital image processing has led to the development of a suite of edge detection and area processing functions that are perfectly suited for automated metrology, feature analysis, and flaw detection.

Stage motion path for continuous image capture.



AMF advanced video analysis



VMS and Elements

Automated Solutions for Process Monitoring and Control Requirements

The VMS™ Experience

VMS software is a video metrology development environment designed for standalone applications and integration into automated production settings. VMS allows windows and toolbars to be sized and arranged to suit the user's preferences, enabling the user to tailor the user interface to create turnkey custom applications without modifying the base software. VMS software is the choice for demanding metrology requirements for automated production settings.

VMS Functions

VMS is designed to be easy to use without sacrificing capability. VMS provides full access to data structures and utilizes variables, expressions, loops, logic, file I/O, advanced image processing, and custom alignments to serve the world's most demanding metrology applications.

In addition to its advanced programmable measurement capabilities, VMS offers robust exception handling, advanced feature constructions, customized output, and control of process automation tooling via digital I/O.

Advanced Functions Made Easy

Built-in wizards take the guesswork out of setting up high-level sub-routines. For example, the Call Procedure wizard combines the Help text and drop-down menus for each of the function's arguments. The Image Acquisition dialog allows the user to quickly acquire images and AMF data sets, and create stitched or Extended Depth of Field (EDFI) images. The Edge Diagnostics window shows detailed information about edge finding, thresholds, and profiles that are useful for optimizing edge performance in all situations.

Advanced Edge Processing Tools

Multi-function tools such as Blob and Centroid enable flaw detection and feature presence or absence checking, in addition to dimensional measurements and feature centering.

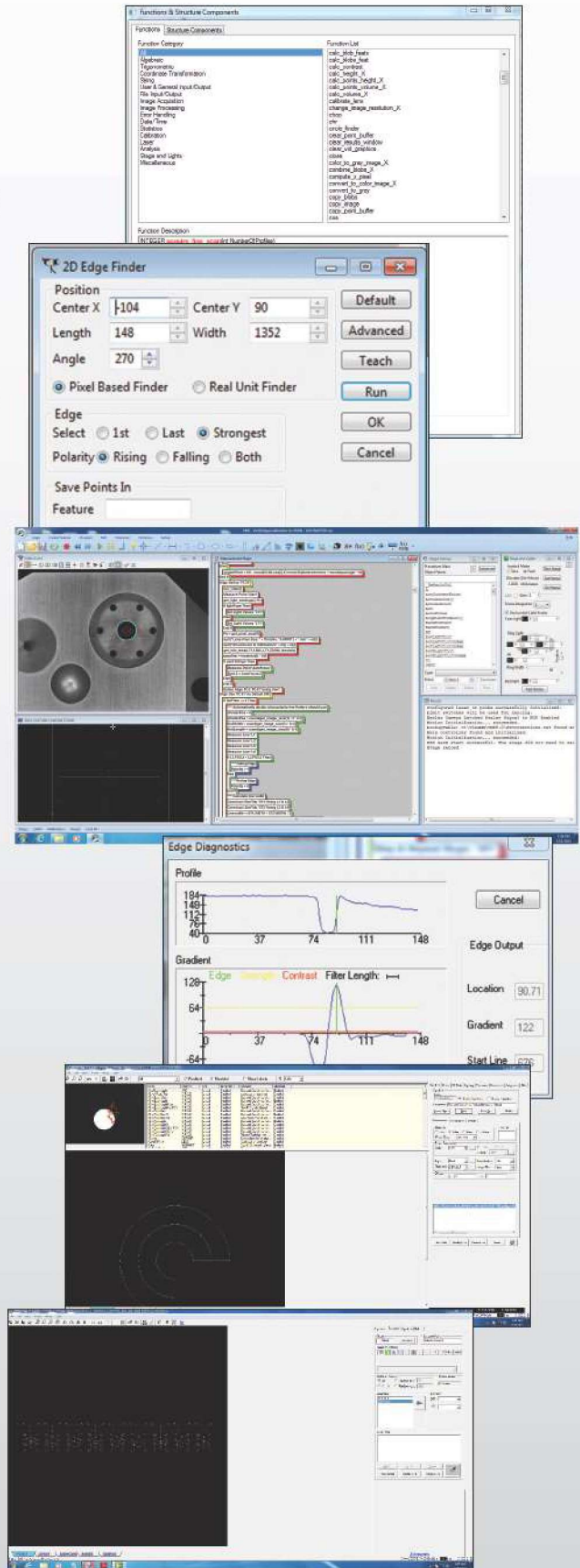
Elements

Elements® software is designed for precision measurements of electronic assemblies in a high-mix manufacturing environment. No time-consuming programming is needed – simply import the CAD file and select the features to measure and inspect. Elements allows part changeovers to be set up in minutes, not hours.

Elements optimizes the entire inspection sequence and routing for the selected features, enabling thousands of features to be measured in minutes.

CAD Import and Editing

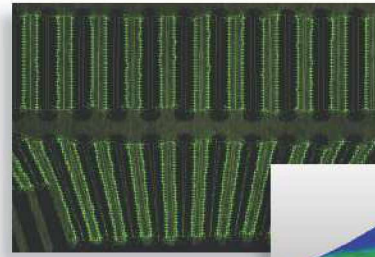
Elements can import and use a variety of 2D CAD file formats such as DXF or Gerber, or CSV list files as the basis for the measurement routine. Elements' powerful editing capabilities allow for the editing or removal of extraneous features in the CAD file. This tight integration of CAD into the measurement routine saves time and reduces errors in production settings.



ZONE3 metrology software puts the power of OGP's 30+ years of multisensor experience into your measurement system for faster, easier, and more productive measurements than ever before.

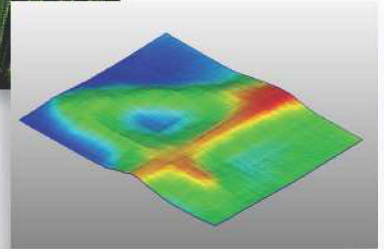
- **ZONE3 is fast.** Synchronous, full field image processing and high-speed cameras allow entire scenes to be measured instantly.
- **ZONE3 is capable.** Full multisensor capability, including scanning laser and scanning probe support, GD&T, and custom scripting.
- **ZONE3 is easy to learn.** Regardless of which member of the ZONE3 family you use – Express, Prime, Pro, or Offline – alignments, measurements and constructions are shown graphically in real time.
- **Offline programming** of any sensor allows parts to be continuously measured while new programs are written. The same procedures are used for all sensors. Learn one, you've learned them all.

Advanced Video Tools

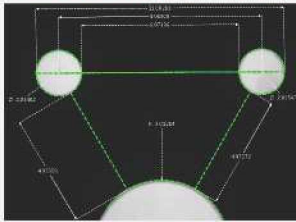


Parallel Processing

Area Multi-Focus



Manual Measurement



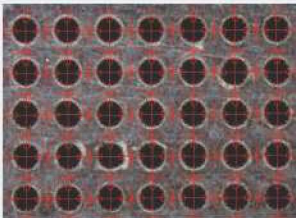
Use manual targets to make quick and easy walk-up measurements.

- No need to set up a part or import a CAD file.
- Manual measurements can be read directly off the DRO.

Use **FeatureExtractor** to automatically identify and measure features visible within the FOV.

- With one click, all prominent features are displayed as flyouts in the video window.
- Interactively hover over features to see relationships to other geometries.

Automatic Edge Analysis Tools

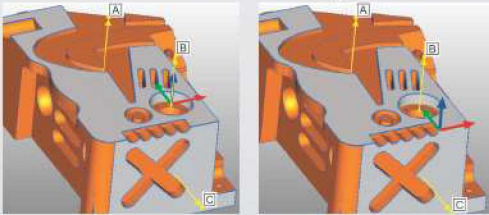


FeatureFinder® enables you to measure practically any kind of edge quickly and easily. When you select an edge from the video image, it automatically finds the points along the selected geometric shape (line, arc or circle), performs all the edge analyses, and displays the measurements.

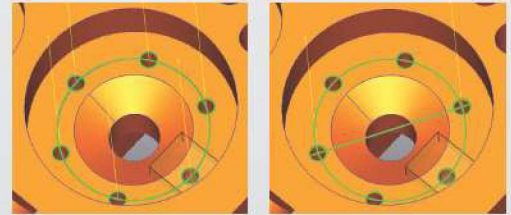
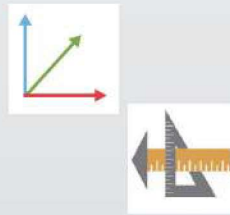
Parallel Processing combined with intelligent routine **Optimization** allows the simultaneous measurement of as many features as can be seen.

Visual Validation: Guiding You Through the Measurement Process

ZONE3 previews offer visual validation of each operation before it's executed. You get immediate visual feedback so common errors and unintended consequences are avoided.



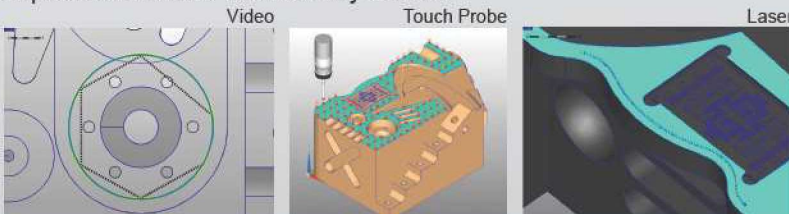
Two different outcomes based on the user's selection of Datums A-B-C (left), or A-C-B (right).



Constructions of bolt hole circle and maximum distance between two holes in that circle.

Path Generation

ZONE3 AutoPath uses CAD nominals to automatically create an optimal path for each measurement. AutoPath is fully multisensor capable. Use AutoPath with any sensor.



Reporting

- ZONE3 recognizes ASME Y14.5 and ISO 1101 standards for GD&T.
- Animated tolerance zones* allow you to visualize the specified tolerance condition.
- Specialized modules are available for Roughness, Gear, and Thread Evaluation
- Results can be output to PDF, Excel, or graphically to truly visualize the result.

*US Patent Number 8 793 097 B2

OGP Advanced Production Systems Lineup

OGP's Advanced Production Systems combine the key technologies needed for consistent accuracy and productivity in advanced manufacturing operations.

Built-in Measurement Stability – Solid granite provides vibration isolation and measurement stability for use from the production floor to the metrology lab.

Optical Interchangeable Lenses – Advanced fixed single-magnification or optional dual-magnification optics, illumination, image processing, and available Continuous Image Capture make it a world-class metrology system.

Multisensor Versatility – Optional touch and scanning probes, TTL Laser, and Rainbow Probe

Benchmark

High Performance Compact Floor Model Metrology System

Benchmark™ is a compact floor model system engineered for high performance and reliability. Its stage is ideal for medium format metrology applications that require high throughput, accuracy, and precision - making it a world-class metrology system. Benchmark highlights:

- 300 mm x 300 mm x 200 mm servo-powered compound XY stage
- Versatile platform for general purpose use
- Common Applications: PCBs, Medium size stencils, ink-jet nozzles, flex circuits, pick and place system calibration, wire-bonding



Pinnacle

High Throughput, High Accuracy Metrology System

Pinnacle™ delivers unmatched accuracy and throughput, with the lowest cost of ownership for any automated measuring system of its kind. State-of-the-art linear motor control technology provides the fastest, most reliable platform available for high volume operation in production environments ranging from cleanrooms to factory floors. Pinnacle highlights:

- 250 mm x 150 mm x 100 mm linear motor compound XY stage
- Precision ball screw Z drive
- Common Applications: Hard disc drive components, wafers, probe card components



Summit

Large Area, High Accuracy Dimensional Metrology System

Summit™ delivers high accuracy and high measuring speeds for near-line process monitoring and quality assurance applications. High-Speed linear motor XY drives ensure very high productivity on the factory floor. It is ideally suited for measuring large footprint parts and nested groups of smaller parts. Summit highlights:

- 450 mm x 600 mm x 150 mm linear motor stage with fixed granite bridge
- Precision ball screw Z drive
- Common Applications: Large footprint parts like stencils, flat panel displays, shower heads, etching sheets, mask patterns, as well as nested groups of smaller parts



Additional Multisensor Systems from OGP



First introduced in 1992, OGP® SmartScope 3D multisensor measurement systems are one of the world's most popular and versatile dimensional measurement systems for precision measurement challenges.

OGP SmartScope systems combine optical, laser, and tactile sensors, letting you measure parts more completely, with lower uncertainty and in less time.

SmartScope systems are designed as multisensor systems from the ground up. All sensors are integrated seamlessly with the system mechanics and software, simultaneously calibrated, and available for use at any step in the measurement routine.

SmartScope systems from OGP utilize multiple capabilities, usually found in multiple specialized systems, within a single system. This added versatility translates into lower capital expense and lower operating costs for your benefit.

SmartScope systems are used by manufacturers around the world – from applications like quick walk-up measurements on the shop floor to intricate Industry 4.0 production environments with full automation.



Scan to see the **SmartScope** video

Additional Multisensor Systems from OGP



Fusion™

Fusion systems are innovative multisensor measurement systems that combine a unique large field-of-view (LFOV) optical system with tactile and laser sensors to form a uniquely productive multisensor metrology system.



FlexPoint™

FlexPoint floor model systems are true multisensor systems supporting tactile and non-contact sensors such as the optical video probe and TeleStar interferometric laser all powered by ZONE3. The VersaFlex™* multisensor head offers up to three simultaneously available sensors on an articulating probe head. With several sensors simultaneously available, there is no downtime while individual sensors are exchanged from a change rack, and no need to recalibrate each time a sensor is used.

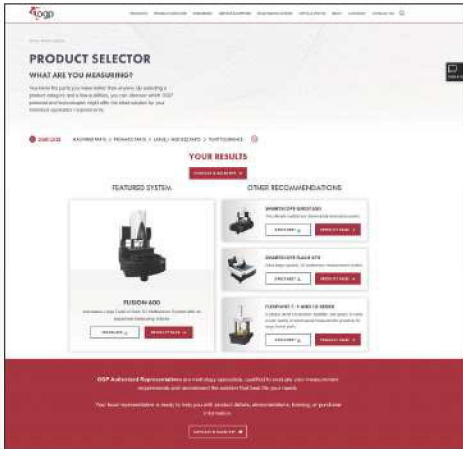
*US Patent Number 10 222 207 B2



VersaFlex Articulating Sensor Array

ADDITIONAL INFORMATION ABOUT OGP SYSTEMS

Explore a range of knowledge assets to help guide your research!



Product Selector

This self-guided selector assists customers and potential customers in identifying OGP products as a solution to their measurement needs.

Customers select what kind of parts they manufacture, what size the parts are, and the tolerances they need to meet, and the selector suggests a featured system and other recommendations based on the customer's input.



Knowledge Center

Find numerous white papers, case studies, tech reports and other educational material about dimensional metrology and OGP product solutions.

You can also quickly learn about OGP technology and solutions by watching product explainer videos.



ZONE3.zone

ZONE3.zone is the online community for ZONE3 users. Connect with fellow ZONE3 users and OGP Application Engineers to share metrology tips and get answers to your questions about ZONE3 features.



Find a Sales Rep

OGP Authorized Representatives are metrology specialists, qualified to evaluate your measurement requirements and recommend the solution that best fits your needs.

Your local representative is ready to help you with product details, demonstrations, training, or purchase information.



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