



SMARTSCOPE
QUEST
high accuracy metrology
solution





Optical Gaging Products & SmartScope Quest

Optical Gaging Products (OGP®) began in 1945 manufacturing optical comparators, charts, and fixtures. With rapid growth of that business, OGP became a global leader in optical inspection technologies.

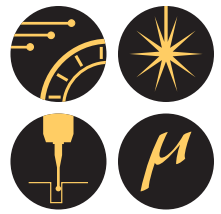
Always a trailblazer in metrology for manufacturing, OGP introduced the world's first video comparator in 1967. In sync with the needs of manufacturers, OGP pioneered multisensor metrology in 1986, introducing a single measuring system with vision, touch probe, and laser sensors.

To satisfy the industrial need for high-accuracy metrology systems, OGP developed the first SmartScope Quest system in 2000 with an outstanding combination of technology and ease-of-use. Since that time, the product family has expanded to satisfy the quality requirements of manufacturers around the world. As a Quality Vision International company, OGP products incorporate the latest "technology by QVI."

At OGP, innovations continue, with advancements in optics, sensors, illumination, and transport design that keep OGP positioned as the leading global supplier of non-contact and multisensor measuring instruments. Today, thousands of SmartScope Quests and its SmartScope siblings are used daily in more than 60 countries to help manufacturers improve quality.



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OGP SmartScope Quest

A family of high accuracy multisensor measuring systems

Load a part. Start a measurement. OGP SmartScope Quest does the rest — with precision.

Metrology is the science of measurement. SmartScope Quest takes multisensor metrology to another level of accuracy and capability. Engineered from the ground up for highest accuracy performance, every SmartScope Quest system incorporates the latest patented innovations from Quality Vision International.



SmartScope Quest systems offer deployable sensors and integrated rotary tables for unattended measurement of the most complex parts, such as the turbine blade shown here on the HDR (heavy-duty dual rotary indexer).



SmartScope Quest systems are designed for high accuracy metrology with innovative structural materials — such as the specially cast metal bridge supported by granite uprights secured to a massive granite baseplate, all selected for maximum stiffness and vibration dampening — as on these SmartScope Quest 650s.



MEASURE for success

Measuring affects everything

Dimensional measurement is one of the most important manufacturing processes. It is the determining factor in the quality of manufactured parts.

The concept is actually quite simple. Magnifying important areas of a part allows the system to determine size and position of magnified features accurately. Closed loop stage positioning with high-speed motors and precision linear scales allows the system to perform magnified measurements anywhere on a part while the system's software uses those measurements to verify important dimensional relationships. Once a measurement sequence is programmed, it can run automatically – without human interaction.

Speed and precision, in one package

SmartScope Quest is synonymous with precision — but it is also synonymous with speed. Its core video measuring technology is fast – with software algorithms that acquire and analyze multiple data points simultaneously. A Quest system gives you the hard numbers you need to make important product and process decisions. SmartScope Quest can give you more measurements, and give them to you faster so you can make smart business decisions and stay in better control.

Besides its industry-leading video measurement capability, productivity can be improved even further by outfitting a Quest system with laser, touch probe, and/or micro-probe sensors. On a multisensor SmartScope Quest system, you get all the measurements you need in one place, rather than having to re-stage parts on multiple machines. And when you fixture batches of parts for all-at-once measurement on a Quest, productivity can be improved even more.

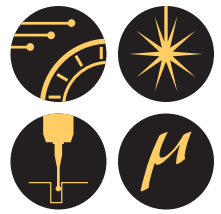
Use SmartScope Quest anywhere in the manufacturing process — from incoming inspection to first article inspection of a new part or process, to audit or 100% inspection, or as part of final, outgoing inspection.

Choreographed stage motion

Simultaneous motion of Quests' DC servo-driven X, Y, and Z stages (or optional XY linear drives on some systems) gets every measurement location into position fast. Precision linear scales with sub-micron resolution keep track of point relationships throughout the system's measurement volume, ensuring positioning repeatability and accurate, repeatable edge detection.



SmartScope Quest 300 with patented “elevating bridge” design, dual Z-axis motor drives, and dual Z scales.

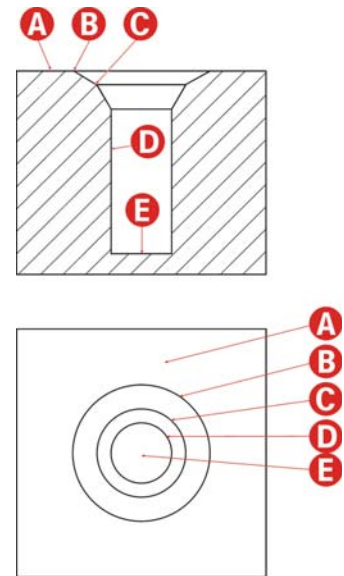


WHY MULTISENSOR?

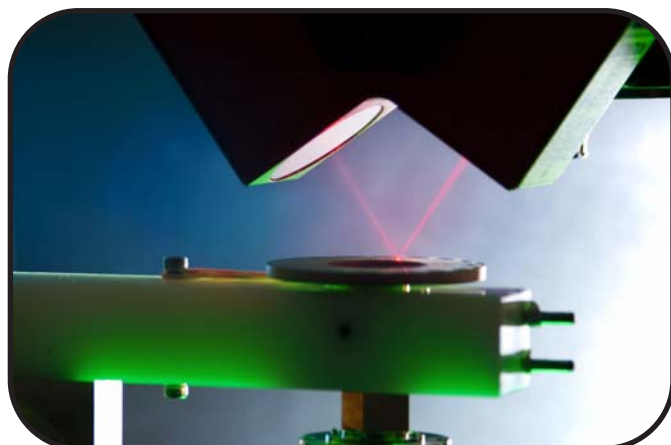
Certain features are easier to measure with one sensor than another. For example, consider the blind countersunk hole illustrated in the figure to the right. With the part mounted in one position, since video excels at edges, it can easily measure chamfer diameters B, C, and D. To measure the angles of B-C and C-D to A, a non-contact probe scan is the best tool. It can acquire data as it scans across surfaces. With its small spot size and rapid data acquisition speed, scans produce profiles that can be analyzed with the metrology software to measure the chamfer angles.

Determining if Bore D is perpendicular to A presents a different type of measurement challenge. Video can measure the diameter at the top of the bore, but it cannot image the walls of the bore. Laser scanning will not work either because D presents no surface to reflect the laser light when scanned from above. In this case, a touch probe is the best sensor to use. It can enter the bore and acquire data points anywhere on bore D. The software can fit the data to a cylinder and intersect it with A.

Finally, the depth of the bottom of the bore, E, may present a challenge. It may be beyond the video focus depth. If a touch probe with an appropriate stylus is available, it may be able to reach the bottom of the bore. If TeleStar TTL laser is configured, its long working distance will allow it to acquire focus points individually or as part of a scan. No matter the sensor, data points can be fit to a plane so both the distance from and the parallelism to Plane A can be verified.



Get complete 3D measurement data from a single SmartScope Quest. Video, contact and non-contact probes, and micro-probes combine for total part characterization, with high accuracy, in a fraction of the time it would take if using separate measuring systems.





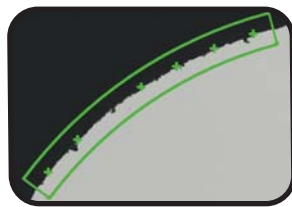
VIDEO measurement

Seeing is believing

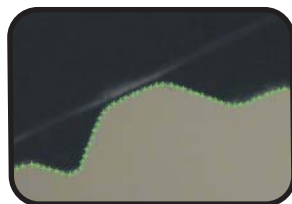
OGP has introduced innovations in video measurement technology for more than 30 years. Video measurement by SmartScope Quest systems is a fast, but multi-faceted process that includes computer control of motorized metrology zoom optics, XYZ translation stages, rotary indexers, and LED illuminators, together with high-powered edge detecting and focusing algorithms to measure fast and without contact. Every SmartScope Quest system uses the latest video technology to provide reliable, non-contact measurements of size, position, straightness, flatness, diameter, radius, and much more.

Video tools speed the measurement process

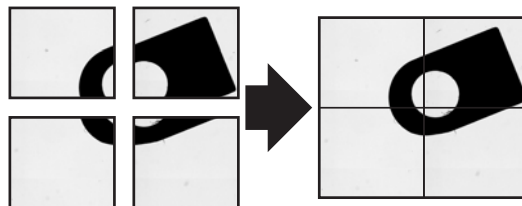
Quest's impressive selection of video tools gives you the best possible video measurements, with minimal effort. Advanced video tools like FeatureFinder™, Strong Edge, Weak Edge, Autofocus, Edge Trace, Centroid, Patterns, Stitching, Max Point, and Point Entry facilitate and speed the measurement process, saving time and money.



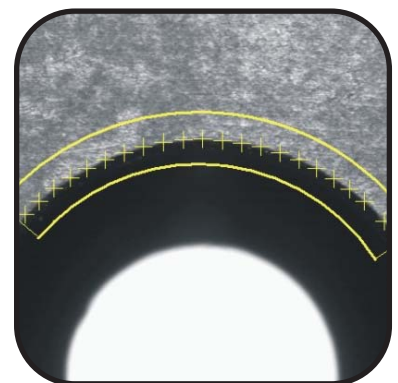
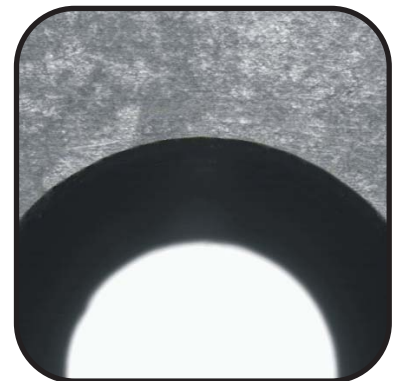
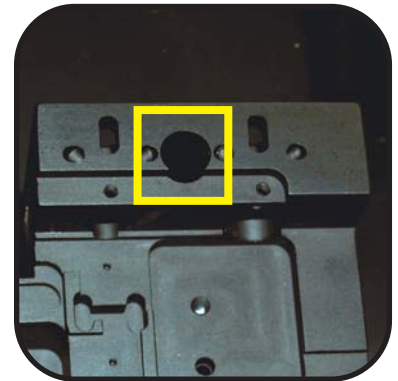
FeatureFinder™ Click just a few points to identify data points along circles, arcs, and lines.



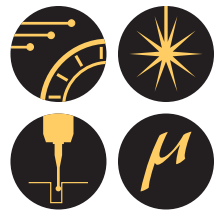
Edge Trace. Automatically scan an edge or perimeter, within or outside the field of view.



Stitching. Multiple fields of view can be stitched together to facilitate pattern recognition for auto alignment and defect detection.



Load, illuminate, magnify, and measure your part. Non-contact video measuring is fast, accurate, and repeatable.



METROLOGY OPTICS

Zoom up for accuracy

In video measurement, image is everything – since it is the *image* that is measured. System optics must be of excellent quality to present an undistorted image to the camera. Every Quest features the patented TeleStar® 10:1 continuously variable, fully telecentric zoom lens, designed specifically to present a highly accurate image to the video camera, in service to the ultimate goal of providing precision metrology.

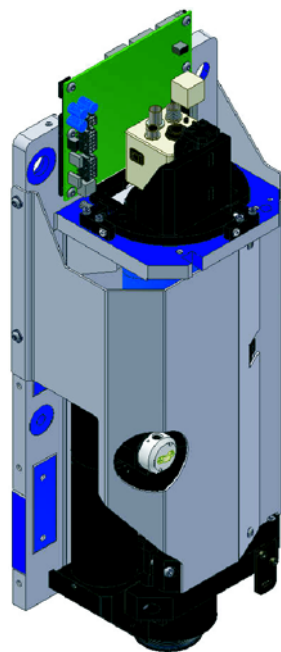
Magnification matters

Sometimes you need to look closer to see the big picture. The 10x TeleStar lens makes it easy to measure at the optimal magnification for every situation. Zoom up on small details to maximize measurement data density, then easily change magnifications as needed. Its telecentricity avoids image size changes with focus position. With TeleStar, it is possible to perform accurate video metrology and get measurement versatility without the limitations of a fixed lens or the limited choices of turret-based lens systems.

Auto-calibrating technology

A large magnification range is useful, but precision measurement depends on a calibrated field of view at every magnification. QVI's patented AccuCentric® technology calibrates the lens system at every magnification change. The process is automatic and fast, and ensures accuracy throughout the lifetime of the system. With AccuCentric, it's like having an entire series of calibrated fixed lenses — without the need to change them between measurements — and without the cost.

“In video measuring, image is everything — since it is the image that is measured.”



The motorized 10x TeleStar metrology zoom lens, used in all SmartScope Quest systems, provides the highest quality images, optimized for precision metrology.



VIDEO measurement

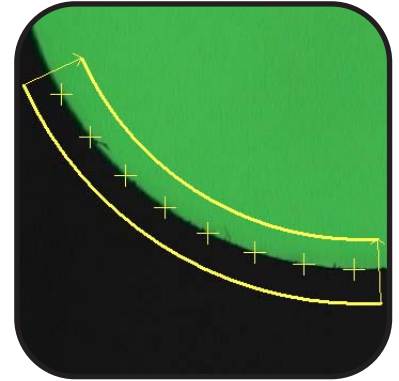
IMAGING

Converting the image

Images relayed by the 10x TeleStar zoom lens are converted by the solid state camera to electrical signals. Signal levels from pixels in the camera's detector array are analyzed, with sub-pixel resolution, to locate edges with great precision so they can be measured accurately.

Leading edge performance

OGP MeasureMind® 3D MultiSensor software performs edge detection that is highly accurate and repeatable. Time-tested and field-proven image processing algorithms discern the slightest variations in intensity and contrast to distinguish true edges from extraneous debris and burrs, providing accurate, repeatable measurements of real world parts.



ILLUMINATION

Get the best image quality with the variety of OGP lighting technologies available in every SmartScope Quest. Whether surface lighting from directly above or at oblique angles, or uniformly distributed profile lighting that tracks the optical system during stage motion, image contrast and intensity are easily optimized for every situation with innovative OGP illumination technologies.

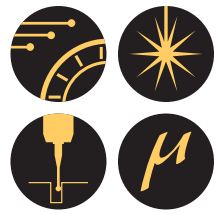
Programmable illumination

Reliable measurements require consistent system performance. Programmable illumination enables every part to be measured with the same lighting conditions, regardless of who operates the measurement system. All illumination settings are retained in each part program so they are repeated at each step in a measurement routine.



Substage backlight

Profile illumination is important for measuring part edge contours, through-holes, slots, and other features that pass through a part. Backlighting is optimized on every Quest system through the use of collimated green LED illuminators, paired with sophisticated video cameras that are optimized for monochromatic spectral response.



Coaxial surface illuminator

Many times, illumination from directly above the part, inline with the optical axis of the system, is most effective at optimizing surface detail and internal features. The coaxial surface illuminator in SmartScope Quest uses green or white LEDs (depending on system configuration) for bright, uniform lighting that is great for magnified visual inspection.



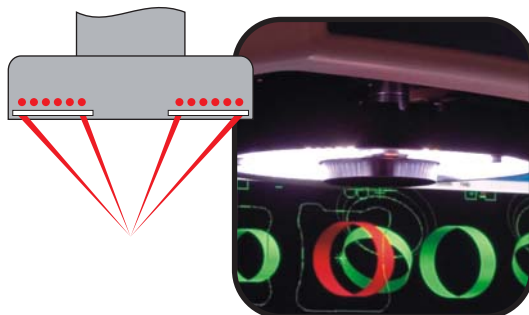
Grid projector

Mirror-polished and transparent parts have no surface structure to bring into focus. The available Grid Projector uses an LED source to project an easily focused pattern onto the surface of a part. Quest systems are designed so the surface of the part is in focus when the projected grid pattern is in focus.

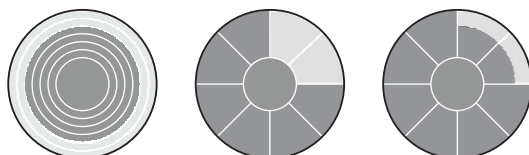
SmartRing light

When features or edges that need to be measured are on the surface of the part, the patented SmartRing™ LED illuminator is the tool of choice. It can direct light from its white LEDs at adjustable directions, angles, and intensities. Illuminate features from the side to highlight their edges. Measure one edge with light from one angle and another with light from the opposite direction – without moving the part. With SmartRing, low contrast features stand out for increased measurement accuracy.

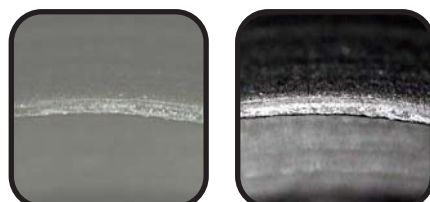
The SmartRing illuminator has concentric rings of LEDs divided into eight segments. The intensity of individual rings, segments, arc segments, or combinations can be adjusted. Its patented Fresnel lens and the TeleStar zoom lens are confocal for optimal imaging and simple operation. The lens allows it to direct light at all angles and directions while maintaining a constant working clearance from the part. For optical configurations that extend the imaging system working distance, a Fresnel lens with a longer focal length is easily interchanged.



The Fresnel lens at the front of the **SmartRing light** enables a multitude of surface lighting conditions with the convenience of a fixed working distance.



SmartRing LEDs can be lit in rings, sectors, or any combination to highlight any edge.



Without SmartRing

With SmartRing

SmartRing-highlighted edges are easier to see – and measure.



MULTISENSOR options

Do more with your Quest

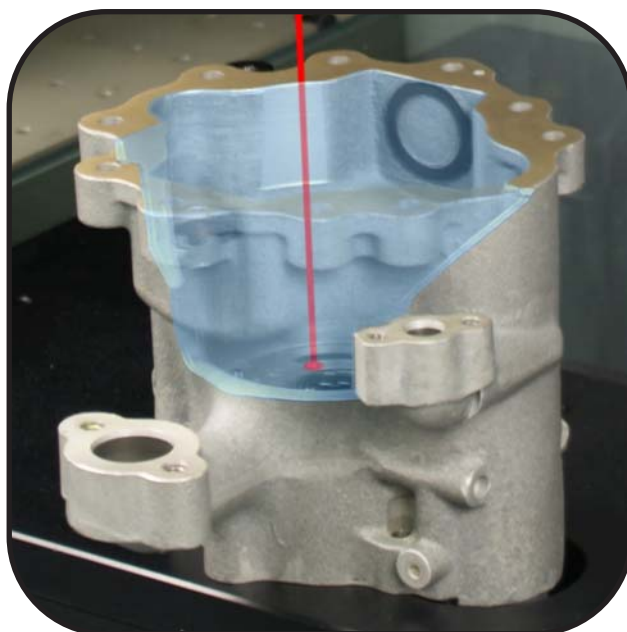
Video measurement is fast, versatile, and extremely capable. Yet parts can have features that video simply cannot measure. For example, curved surfaces are better measured with a scanning point sensor, while a touch trigger probe is better able to measure the walls of a bore. The available range of sensors address other measurement challenges, too.

Built for multisensing, from the ground up

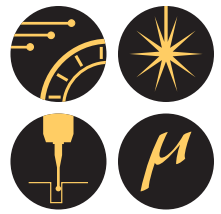
It's true, SmartScope Quest was designed with multisensor in mind. Adding multisensor capabilities to a Quest system makes measuring parts easier and more efficient. Fixture a part once, and get detailed measurements from a variety of sensors benefitting from their individual strengths and characteristics. Use video for edges and focus points, or a touch probe to reach features inaccessible to video. Scan with a contact or non-contact sensor for surface shape data, and use a micro-probe to measure micro-scale features from EDM and other manufacturing methods. Since the Quest easily switches between sensors during an automatic measurement routine, it does all the work while you are free to manage other parts of your business.

Replace dedicated measurement machines

You can buy a separate video machine, CMM, and laser scanner system. But each single-sensor machine requires its own unique fixture, software, and a skilled operator to run it. Lean manufacturing is more difficult with multiple measuring machines because parts can pile up by each one, delaying important production decisions and possibly jeopardizing quality. And all Quest systems are calibrated within a common system and use MeasureMind metrology software, so there is consistency that may be lacking when comparing data from several different measuring machines. Increase throughput and remove bottlenecks by doing the work of several of those other machines in a single set-up on a multisensor OGP SmartScope Quest. Optimize accuracy, programming time, and throughput by using best practices on each measurement by selecting the most appropriate sensor.



Get accurate, repeatable measurements regardless of how many sensors are used, how many measurement steps are involved, or how many times sensors are changed during a routine — all without moving the part.



NON-CONTACT OPTICAL POINT SENSORS

Light can be focused with high precision and scanned across surfaces to derive high resolution surface profiles. Quest is available with a variety of non-contact optical point sensors. Use them to probe points on surfaces like a touch trigger probe, but without surface contact. Or scan across the surface, tracking changes in surface heights at high resolution. Tight integration with the system mechanics keeps the optical point sensor in focus as it rapidly scans the part surface, even as it follows large variations in the surface profile.

When a optical point sensor is scanned, both programming and measurement times are kept to a minimum because there is no need to “teach” the sensor about the measurement path prior to the scan. With just a few points, intelligent algorithms automatically drive the laser to follow the part contour, collecting data at a user-defined velocity and data-sampling rate.

TTL laser

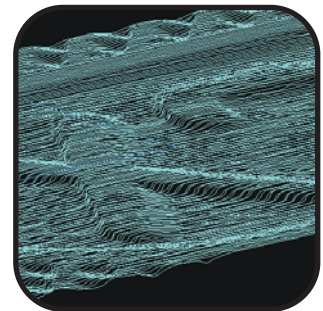
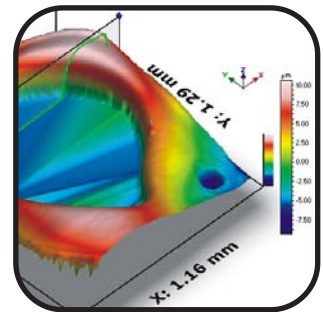
SmartScope Quests are available with the unique TeleStar interferometric TTL (through-the-lens) laser — the same technology used to calibrate gage blocks. By incorporating a TTL laser into the optical system of a multisensing machine, a part area can be imaged, measured with video, and scanned with a laser with minimal stage motion when compared to off-axis sensor configurations. The narrow operating angles of the TTL laser light allow it to access surface areas that are deeply recessed or located adjacent to vertical surfaces – areas where light might be blocked when using a triangulation laser. And its long working distance — up to 200 mm — allows it to access features not easily accessed by other sensors, like the bottom of a deep narrow bore in a casting. This laser can also be reflected from a mirror to measure difficult-to-access features.

DRS laser

DRS™ (Digital Range Sensor) lasers are self-contained modules that use laser triangulation to measure surfaces. Offset from the video optical axis by a fixed distance, a DRS laser can be deployed when needed and retracted for storage automatically during a measurement routine. There are DRS lasers for specular (polished) surfaces and for diffuse surfaces, with a range of resolutions, capture ranges, and working distances. DRS lasers are user-interchangeable to accommodate changing needs.

Rainbow Probe

The Rainbow Probe™ is a scanning white-light sensor that provides nanometer level resolution of surface heights without contact. The self-contained probe projects white light onto the part. Because of the spectral composition of white light, the colors of light reflected from the surface are directly related to sensor-to-surface distance. Thicknesses of films or transparent objects can also be measured. Available models all offer sub-micron resolution with spot size down to 2 μm, enabling measurement of minute imperfections in surface contours. Like all SmartScope Quest sensors, Rainbow Probe can be called upon at any point in a measurement routine, and its data used with those of any other sensor.





MULTISENSOR options

MICRO-SENSORS

For the smallest, most sensitive features

As manufacturing technologies advance, tolerances are getting tighter, while parts and part details are getting smaller. Measuring this new breed of parts is a challenge facing many manufacturers today. Existing metrology systems may not be capable of providing the necessary measurements. OGP continually advances measuring technologies to support the newest manufacturing technologies. Micro-sensors are examples of our commitment to advancing metrology.



Feather Probe

Probe tiny and fragile materials with the barely-there touch of the Feather Probe™ sensor, with styli as small as 0.125 mm in diameter. In concept like a miniature touch trigger probe, proprietary sensing technology discerns stylus contact with a surface using a minuscule measurement force of less than one milligram (depending on stylus diameter). Unlike touch trigger probes, the Feather Probe approach and backoff distance is minimal, allowing its use in tight quarters with no risk or shanking error. The Feather Probe deploys on command, keeping the sensor safe from possible mishandling when not in use. Applications range from intricate details in precision cast metal and rubber parts to slots and trenches created by precision EDM processes.



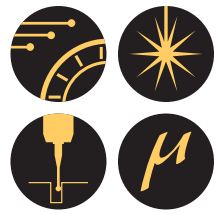
Interposer

A unique blend of video and touch probe technology, the Interposer consists of a slender shaft with a probe ball of a known size on its tip. The Interposer tip is mounted so it is within the video FOV of the measurement system. In use, the probe ball is brought into the optical field of view and lightly into contact with a feature. When the centroid of the ball moves, contact has been made with the feature. Once contact has been made, automatic video measurement measures the position of the probe ball. Since the probe ball diameter is known, the tangent point where it contacts the part feature can be determined precisely. Because Interposer is rack-mounted and brought into the field of view only when needed, it does not interfere with other types of measurements, enhancing productivity. Also, parts fixtured for video measurement can be measured with Interposer without refixturing. Interposer is often perfect for measuring tiny internal features, such as grooved recesses within bores.



Laser Pointer

The available laser pointer on Quest systems can help zero in on part locations for subsequent video measurement. Simply hold down the switch on the controller joystick, and move the stages until the spot from the pointer is on the feature of interest. Then you know that after proper focusing, that feature will be within the optical field of view.



CONTACT MEASUREMENT

Measure hard-to-reach features

Sometimes you just have to touch a part to measure it. Contact probes for OGP SmartScope Quest systems add versatility to measurements, reaching and probing features that are beyond the range of other sensors. Reach into bores, slots, and trenches to acquire points to use in determining angular and dimensional relationships to other features and surfaces.

Touch trigger probe

You may have a CMM you use for routine measurements. You can free up that CMM by adding probing as part of a SmartScope Quest measurement routine. With the styli you need in a change rack, it's easy to go to touch probing during an automatic measurement routine – with the part fixtured once. MeasureMind 3D MultiSensor software retains all sensor data points in 3D space so constructions using any or all of that data are possible – and simple to do.

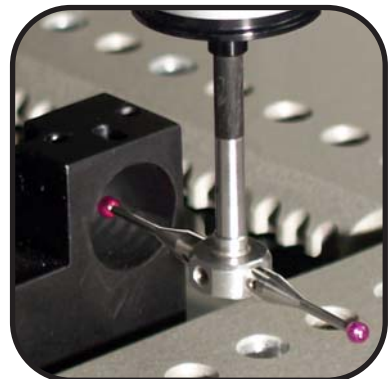
SP25 scanning probe

The SP25 scanning probe adds contact contouring capability to some SmartScope Quest models. MeasureMind 3D software drives the probe, rapidly following the part contour and collecting data points at a user defined speed and data sampling rate. The scanning probe automatically adjusts point density when it rounds a curve. With SP25, programming and measurement times are greatly reduced compared to single point probing.

*“...Quest systems add versatility
...reaching and probing features that are
beyond the range of other sensors.”*



Calibration spheres and change racks are interchangeable, making touch probing accurate and easy.



Configurable touch trigger probes can reach features that are inaccessible to other sensors, without the need to reposition the part.

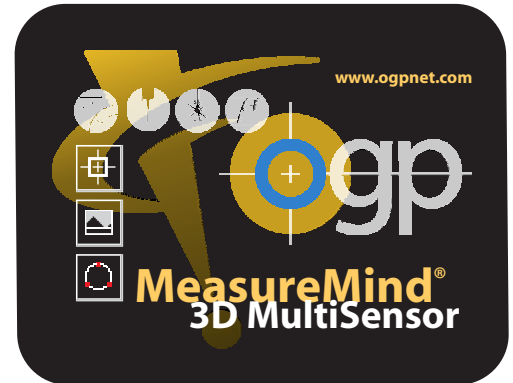


METROLOGY software

MeasureMind® 3D MultiSensor – the name says it all

SmartScope Quest systems are pre-loaded with MeasureMind 3D MultiSensor, OGP's premium metrology software specifically for 3D multisensor metrology. Rich 3D graphics that can show tolerance conditions, and the ability to rotate the coordinate system when using single and dual rotary indexers are but two features of MeasureMind 3D MultiSensor. MeasureMind 3D has a large base of satisfied customers.

MeasureMind 3D makes it easy to create and run automatic routines that acquire data from any sensor and use that data to validate important dimensions, angles and tolerances.



Total integration

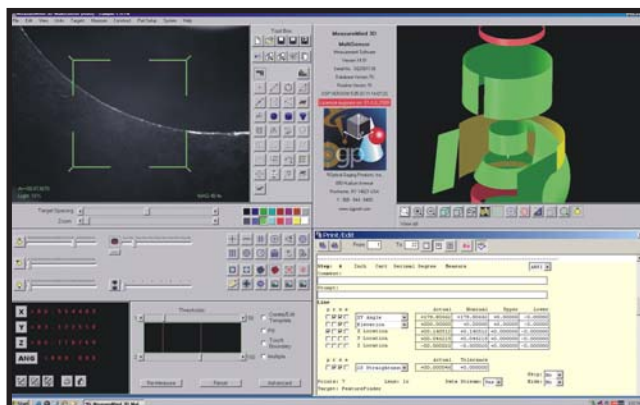
MeasureMind 3D MultiSensor software is feature-rich. Sensor selection and use is intuitive. Control single or dual rotary indexers to bring hidden features within reach of the system's sensors. Retain the spatial relationships of all sensor data, rotating the coordinate system as required to visualize data relationships. MeasureMind 3D MultiSensor easily accommodates complex geometrical forms – cylinders, cones, spheres, planes, and intersections – and their relationships for high-powered, detailed measurement analysis of the most complex parts.

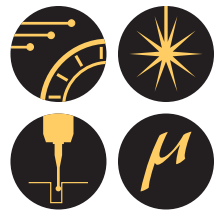
A new dimension of accuracy

MeasureMind 3D MultiSensor builds the model of measured points as the part is measured, so you see data relationships as they develop. Display measured features, nominal features, raw data points, or any combination. Models can be color coded to indicate tolerance conditions. View the model as orthographic, isometric, 3D wire frame, or 3D with rendered surfaces. Mouse controls zoom, pan, and rotate the model to reveal important details. Easily calibrate sensors, volumetric accuracy, nonlinear FOV accuracy, and parfovality accuracy.

All the tools you need

MeasureMind 3D MultiSensor has all the right tools for your most elaborate measurements. Click a feature in the model window to edit its measurement attributes. Easily put information into its most manageable form with a choice of data reduction methods.

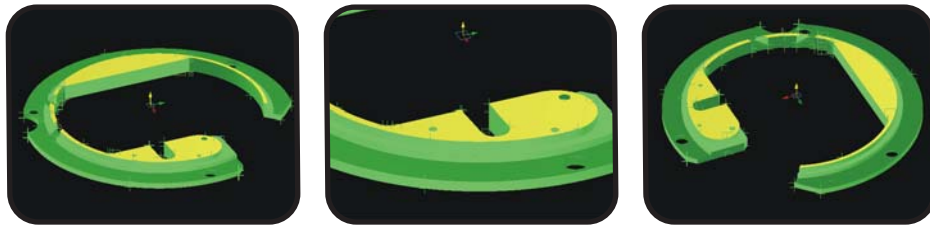




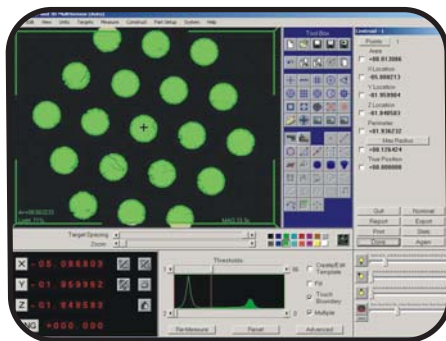
Video metrology, and more

MeasureMind 3D MultiSensor is robust enough for real world measurements. Based on OGP innovation and leadership in video measurement and developed from the beginning to work with OGP multisensor metrology systems, MeasureMind 3D accepts data points from any sensor on the SmartScope Quest system. It has all the necessary tools for every sensor you might use. You never have to compromise to take advantage of the benefits of multisensor measurement with MeasureMind 3D MultiSensor from OGP.

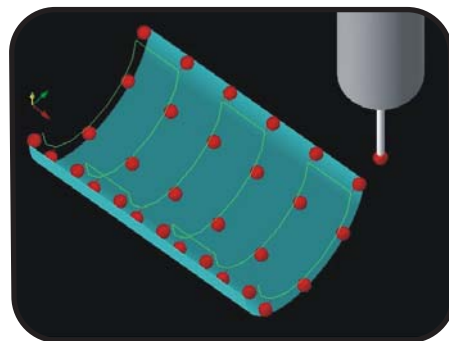
The results: multi-faceted dimensional measurements that really add depth to the SmartScope Quest metrology mix – and take your quality and manufacturing



Use the mouse to zoom in on a feature of interest, rotate, or pan the model to reveal something previously hidden from view.



Advanced Centroid identifies the centers and areas of several irregularly-shaped features within the field of view simultaneously.



Autopath defines a touch probe path based on a minimum of user-selected points.

The **SoftSectioner™** option adds a video sectioning capability to SmartScope Quest. SoftSectioner uses a proprietary algorithm to rapidly generate a profile from all the focus points in a user-defined area – without contact.





SYSTEM guide

Every SmartScope Quest is based on a strong foundation of OGP video measurement technology, and includes common features such as the TeleStar telecentric metrology zoom lens, LED illuminators, sub-micron scales, MeasureMind 3D metrology software, and full multisensor capability. Quests vary from each other in their stage travels, available multisensor options, and value-add software options.

SmartScope Quest 250 High accuracy benchtop multisensor system

SmartScope Quest 250 is a compact benchtop system that features a rigid steel column and a cast metal base for metrology stability. Its 0.10 μm scales (0.05 μm optional) offer excellent precision in a benchtop system. Choose from a high resolution grayscale or color CCD camera. Its field-proven cantilever design offers staged part access from three sides, to speed part mounting and fixturing.

Multisensor versatility

Quest 250 is a leading performance video measurement system that accommodates most of the available multisensor options, including touch probe, off-axis DRS or unique TeleStar TTL interferometric LWD laser, Rainbow Probe, Feather Probe, Interposer, laser pointer, and rotary indexers. This machine is the highest performing multisensor measurement system for small parts on the market.

SmartScope Quest 300 Compact footprint, large measurement capacity

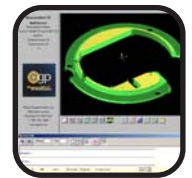
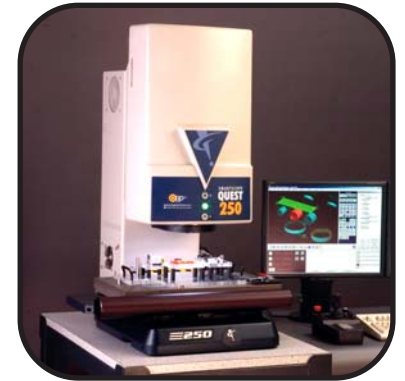
SmartScope Quest 300 features QVI's patented "elevating bridge" design that provides 300x300x250 mm XYZ stage travel, but still fits on a benchtop. This unique mechanical design offers machined-in axial straightness and perpendicularity, and contributes to structural integrity and metrological stability. The optics and sensors move along the bridge in the X-axis, and the mounted part moves only in the Y-axis in the unique pass-through design. Dual Z-axis motor drives and dual Z scales contribute to superior positional accuracy in Z. XYZ scale resolution of 0.1 μm is standard, with 0.05 μm scales optional.

Wide range of multisensor options

SmartScope Quest 300 is an outstanding video measurement system. It can be configured with any of the sensor options available for Quest 250, plus the SP25 continuous-contact scanning probe — a rare capability in a benchtop metrology system. Quest 300 can be configured with a set of sensors that can be part-specific, or capable of a broad range of measurements.

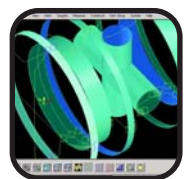
250

300x150x200 XYZ travel

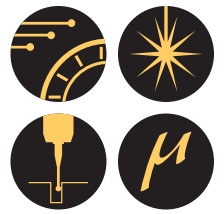


300

300x300x250 XYZ travel



SYSTEM guide



SmartScope Quest 450

Sturdy platform, large capacity

The SmartScope Quest 450 floor model system uses an elevating bridge design that assures XYZ travel orthogonality while limiting part motion to the Y-axis. The heavy granite top plate holds the Y-stage with granite risers attached — the risers secure the X-axis bridge across which the sensor head assembly with its Z-stage moves. DC servo driven stages offer great metrology performance, and optional liquid-cooled linear motors provide XY stage speeds up to 400 mm/sec.

The system of choice

With a range of available Y and Z stage travels, SmartScope Quest 450 will accommodate a range of parts, fixtures, and/or rotaries, including dual rotary configurations. Quest 450 is the system of choice for measuring large, complex parts with tight tolerances.

450

450x450/610x250/300/400 XYZ travel



SmartScope Quest 650

The flagship of the SmartScope Quest family

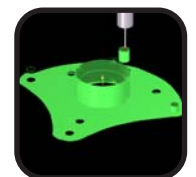
SmartScope Quest 650 is the best in its class. It offers extremely accurate measurements throughout its generous 610x660x400 mm XYZ measurement volume, allowing it to measure complex parts of many sizes. The massive granite support structure and cast damped iron bridge contribute to a volumetric (E_v) accuracy of $1.8 + 6L/1000 \mu\text{m}$. The Y-axis stage supports up to 100 kg. Linear XY motors are standard, and provide acceleration up to 1500 mm/sec^2 .

Versatility is the watchword

Quest 650 was designed for multisensor metrology. The latest QVI sensor technologies are available for almost any specific measurement challenge. SmartScope Quest 650 also accommodates the PH10 for versatile touch probe applications. An optional heavy-duty compound rotary is a set-angle device for measurements in up to five axes. SmartScope Quest 650 is OGP's most capable multisensor system.

650

610x660x400 XYZ travel





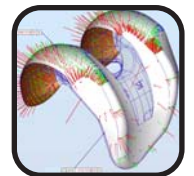
SYSTEM guide

Specialist 300

300x300x250 XYZ travel

SmartScope Specialist 300 Metrology system for medical devices

SmartScope Specialist 300 is a unique benchtop dimensional measurement system designed and configured for medical device manufacturers. It offers micron-level measurements within its ample 300x300x250 XYZ measurement volume to accommodate medical parts such as orthopedic implants, syringe components, and fluid flow components. Fully multisensor capable, Specialist 300 offers robust SmartFeature® software that supports essential 21 CFR Part 11 regulatory requirements including electronic signatures. SmartScope Specialist can be easily integrated into device manufacturers' FDA-compliant manufacturing processes. It can be equipped with video, multisensor, and scanning configurations, with the software fitting module appropriate for the sensor configuration. SmartScope Specialist 300 is a highly capable measurement system designed for quality control of today's diverse range of manufactured medical devices.



CUSTOM SOLUTIONS

If our standard systems don't meet requirements, we can provide custom solutions. Whether turnkey pick-and-place parts handlers, special fixtures, custom enclosures, or totally unique measurement systems, we have the skills and expertise to help meet measurement goals.



ROTARY indexers

Optional rotary indexers for SmartScope Quest make it possible to measure a part in different orientations without removing the part from a fixture. Easily drive these set-angle devices to the position you want and measure. Rotary positions are retained and repeated in programmed part routines.

Single-axis rotaries/4th axis

Miniature Servo

The Miniature Servo (MSR) rotary uses a worm gear drive for positional accuracy, and is compact enough to use on a SmartScope Quest 250. Use it to rotate small parts to minimize handling and get more useful data.

MicroTheta

The MicroTheta™ (MTR) rotary indexer is a high-resolution/high-accuracy closed loop positioner. Its dual reader heads provide angular resolution better than 2 arc seconds. The MicroTheta rotary precisely positions parts without the need to re-measure datum features after rotation.

Heavy Duty Rotary

The Heavy Duty Rotary indexer is designed for heavy parts or fixtures. Its precision rotary encoder has a resolution of 0.001° of arc, and its accuracy is rated at ±5 arc seconds.

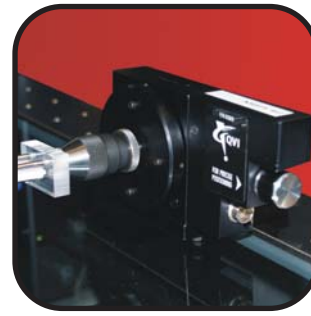
High Precision Rotary

The High Precision Rotary indexer is a compact system with a precision air bearing spindle. It may be used alone or in combination with the Heavy Duty Rotary. Its resolution is rated at 0.9 arc second, and its positional accuracy is ±1 arc seconds between any two points.

Dual-axis rotaries/4th & 5th axis

Two rotary indexers may be combined with their axes perpendicular to each other to add 4th and 5th axes of rotation for increased part positioning options, on SmartScope Quests with sufficient working volumes. Several combinations are available, including **MTR/MSR**, **HDR/MTR**, **HDR/HDR**, and **HDR/HPR**. MeasureMind 3D MultiSensor supports rotated coordinate systems.

MSR



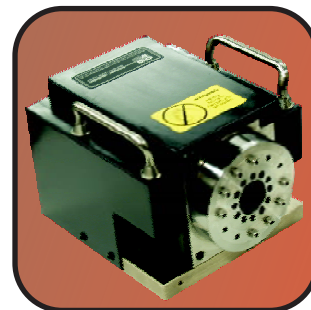
MTR



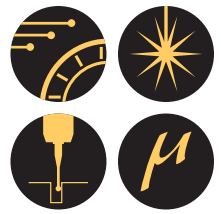
HDR



HPR



Dual





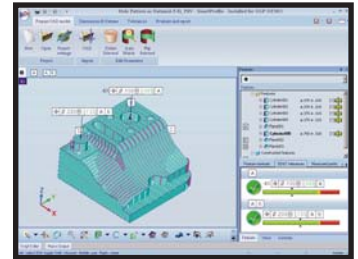
SOFTWARE modules

Extending measurement capability

SmartScope Quest systems can use a variety of sensors — and a variety of optional software — to measure the most complex parts.

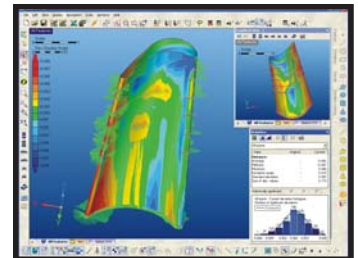
Fitting and GD&T analysis

SmartProfile® is a 3D best-fitting software package with ASME Y14.5 and Y14.5.1 GD&T compliance. SmartProfile takes point clouds of data from part measurements, merges that data with the nominal CAD model of the part with GD&T tolerances, and automatically performs a results evaluation based on those tolerances. SmartProfile then compares measured data with the nominal model and determines if measured features are within tolerance. SmartProfile satisfies simultaneous GD&T requirements per the latest standards. Add automation to SmartProfile for machine control.



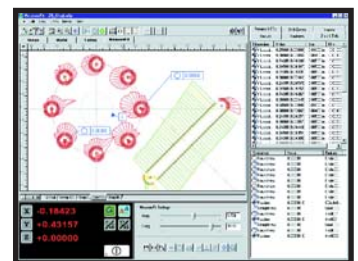
2D/3D fitting

SmartFit® 3D is an interactive 2D/3D fitting package which provides fast and accurate analysis of conformance to shape, form, and dimensions of rigid parts. It compares measured data to the nominal model of the part, as represented by a CAD file. SmartFit 3D can simultaneously compare measured surface points and point clouds to CAD-defined surfaces.



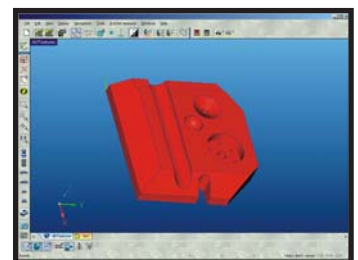
2D fitting

MeasureFit® Plus helps when tolerances are tight and the right fit is essential. This powerful 2D fitting package simultaneously analyzes all measured part features and compares them to a nominal template created from a CAD file. Color graphics vividly depict how well the measured data fits the template. MeasureFit Plus makes it easy to verify compliance to the design.

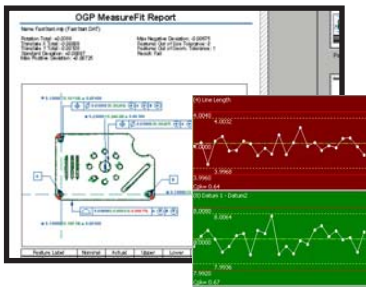
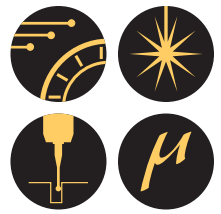


CAD import

SmartCAD® 3D imports CAD files to speed creation of MeasureMind 3D MultiSensor part routines on your Quest system, or offline, right at your desk. Simply import an IGES or other common format 3D CAD file. Then use SmartCAD to select features to measure, set lighting and magnification, and more. The result is a MeasureMind 3D routine that is ready to run. Use your design files to create measurement routines.

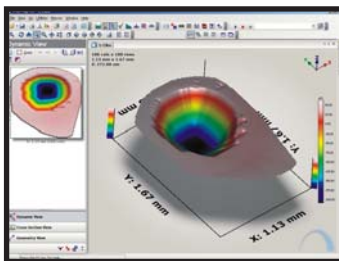


SOFTWARE modules



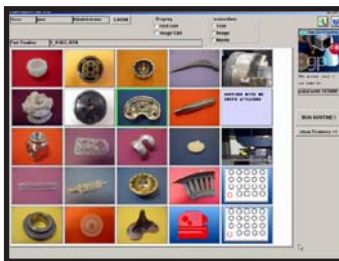
Reporting & Statistical Process Control

SmartReport® powered by QC-Calc™ collects measurement data and outputs them in ways that are simple to share and understand. SmartReport works automatically in the background — gathering, formatting, and outputting data while your routine is running. Monitor your inspection process to keep it in control with SPC. Database creation, data collection, and data display have been fine tuned to make the interface automatic. Includes Control Charts; Process Charts; Built-in Gage R&R; and reports such as First Article, Raw Data, Statistical Summary, and Non-Conformance. Formatted printed reports can be customized with images and graphs.



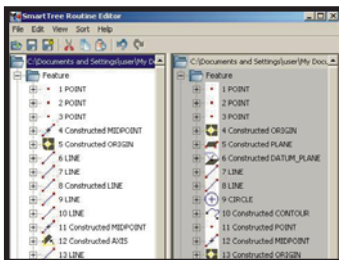
Surface mapping & analysis

TrueMap™ is a surface visualization and analysis software that accepts point cloud data from a multisensor Quest system. Display color surface maps of your data and calculate volume and cross-sectional geometry of specific features. Click and drag the mouse to interactively rotate, scale, pan, and zoom the view of the data.



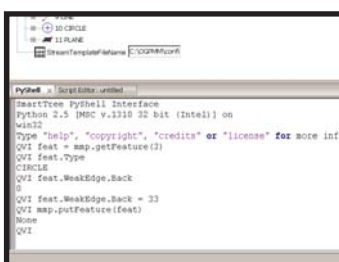
Operator level interface & routine subsetting

SmartFeature™ allows you to measure specific features that are part of a long measurement routine without running the whole routine, and without changing it. It automatically measures all datum and reference features as required. A scrolling window displays measurement results upon inspection completion. Enterprise version adds security features ideal for FDA 21 CFR Part 11.



Measurement routine viewer/editor

SmartTree™ allows you to view and edit measurement routines offline. This allows your SmartScope Quest system to remain productive by measuring rather than programming. Use SmartTree for database changes, to edit steps one at a time, for global editing, and to cut and paste measurement steps.



Scripting

SmartScript™ lets the advanced user write customized scripts using the Python™ scripting language. Possible applications include advanced logic statements, real-time measurement data input from external sources, parametric part routine creation, advanced output, task automation, and many more.

LOOK CLOSER

at a relationship with OGP

A metrology system is an important purchase. It is an investment in the quality of your products. Our services supplement your investment in a SmartScope Quest system – from installation and training, to service and repair, to leasing and financing – OGP does more than sell you a system. We want you to have a solid relationship with your SmartScope Quest – and with OGP.

FINANCE

Easy to use, easy to buy/ There are options for your SmartScope Quest system, and there are optional ways to buy it. If you prefer to finance your purchase, low, fixed-rate leasing protects against inflation and improves your ability to budget and forecast. Payments can be scheduled to coincide with your seasonal cash flow. And flexible end-of-lease options make it a breeze to purchase, refinance, or upgrade the system.

INSTALLATION

Starting out right/ Your SmartScope Quest system will be professionally installed. Proper system setup ensures optimal performance, so we make sure it is properly positioned, level, and stable.

TRAINING

Start measuring now/ Your primary system operator will be trained when the system is installed. OGP's extensive documentation and skilled installers will have you measuring critical dimensions from day one. Specialized training is available at your facility or at regularly scheduled classes at our Rochester, NY headquarters, or one of our many global offices, OGP Authorized Technical Centers, or at the facilities of factory-trained representatives. We are prepared to help you learn how to get the most out of your SmartScope Quest investment.

SERVICE

Keeping you in production/ Your SmartScope Quest system is designed for long-term, continuous use, whether you use it 10 minutes a day or 24/7 – Quest reliability will keep you on schedule. In the event service is required, OGP is ready to respond immediately. From knowledgeable technical phone support and troubleshooting, to on-site service, we will get your system back online quickly. Our team of strategically located Quality Vision Services field technicians are ready to provide on-site repair, as well as scheduled maintenance and service.

SERVICE CONTRACTS

Let us handle routine maintenance/ When SmartScope Quest is an integral part of your manufacturing process, OGP service contracts can eliminate your maintenance concerns. Service contracts offer periodic system maintenance and discounted repair services. And if you have several OGP systems, one contract can cover them all.

WARRANTY

Peace of mind/ Your purchase of an OGP SmartScope Quest system gets you more than improved productivity and quality. We stand behind our claims with strong hardware and software warranties, so you can be confident in your purchase decision.

SUPPORT

Local/ OGP's long relationship with its representative sales force means they are experienced with SmartScope Quest systems and technologies. They know how manufacturers use these systems in the real world. You can count on them before and after the sale to make sure you get all that you can from your Quest system.

Online/ Keep in touch with OGP on the Web at www.ogpnet.com to get even more from your investment. Find product literature, information about software revisions, and more at the Member Center. And sign up for our newsletter to receive new product information and helpful hints for peak operation of your Quest system.

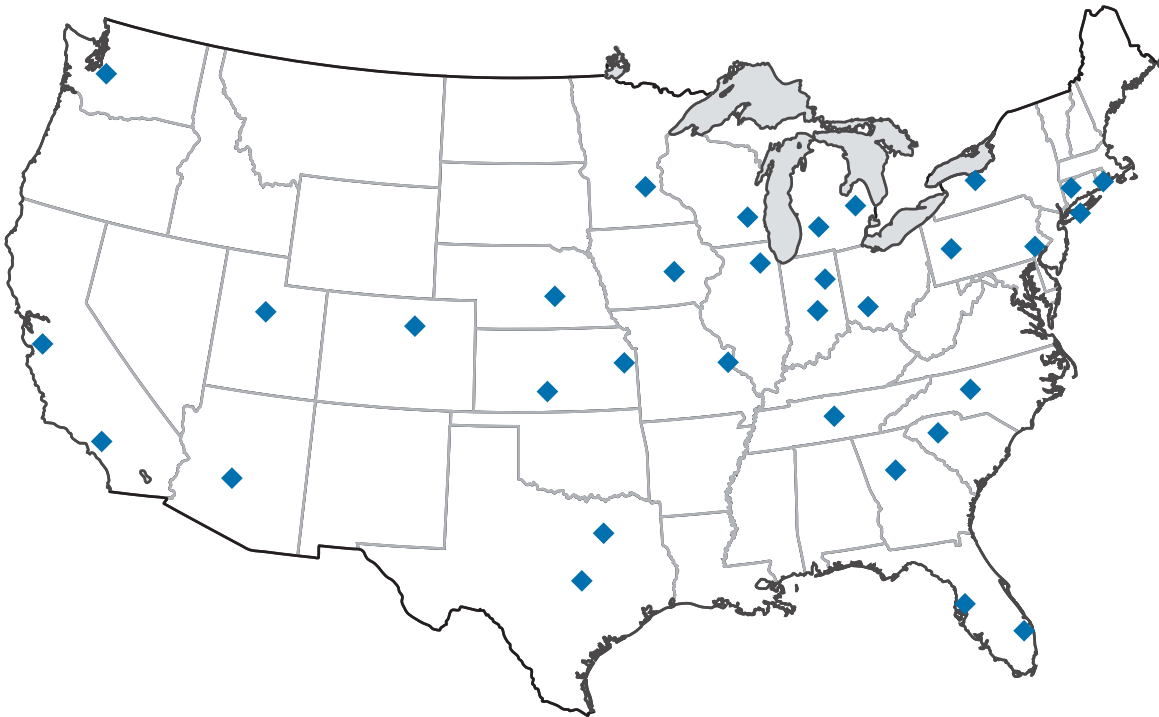
Factory/ Our skilled staff of application engineers is ready to talk about your specific applications. And when you call OGP you speak to real people, not automated answering systems.



SMARTSCOPE QUEST

High accuracy metrology solution

Every SmartScope Quest system is specially equipped to provide the highest in accuracy for the most demanding applications. But every customer is not the same, so every Quest can be tailored to your specific requirements. Let us tailor a Quest strategy that satisfies your metrology needs and enhances your overall productivity. Knowing your options is the first step. Contact your nearest OGP sales representative to determine which Quest configuration is right for you.



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