Gocator®

THE SMARTEST 3D SENSORS ON THE PLANET

CONTENTS

WHAT WE DO

Gocator is our labor of love. We have a dedicated research and development team that takes every factor into consideration when designing the Gocator: from product design, to user experience, to the quality of the output data.

SPEED. PRECISION. PERFORMANCE.

1 COMPACT FOOTPRINT FOR SMALL SPACE AND ROBOT ARM DEPLOYMENT

2 RUGGED IP67 CONSTRUCTION FOR THE HARSHEST INDUSTRIAL ENVIRONMENTS

3 BUILT-IN DATA PROCESSING PUTS THE SMART IN GOCATOR 3D SMART SENSOR

4 FACTORY PRE-CALIBRATED OPTICS AND TEMPERATURE STABLE MOUNTING DELIVER HIGHLY ACCURATE, REPEATABLE RESULTS RIGHT OUT OF THE BOX

5 RICH I/O FOR COMMUNICATING WITH YOUR HARDWARE AND CHOOSING HOW YOU TRIGGER AND SCAN

GOCATOR
IT'S BETTER TO BE SMART.

INTELLIGENCE RUNS IN THE FAMILY

Gocator All-In-One 3D Smart Sensors are trusted worldwide for automated inline inspection.

SCAN, MEASURE & CONTROL

Gocator combines 3D scanning, measurement and control in a single device, with no external PCs or controllers required. This efficient design paired with high-performance functionality makes Gocator easy to integrate into existing inspection systems — minimizing system cost and maximizing product quality and throughput.

All Gocators are factory pre-calibrated so technicians can simply connect a computer to the sensor, open a web browser and configure sensor functions such as exposure, triggering logic, dimensional measurement tools and communication method.

Once setup is complete, simply disconnect the computer, and the Gocator runs standalone delivering high-speed, micron-level measurements in real-time for a wide variety of critical inspection applications.

Gocator is available in a wide selection of models suited to your exact application.

Gocator 4.4 Firmware

THE COMPLETE 3D

Gocator leverages both laser triangulation and fringe pattern projection. These technologies provide optimal 3D scanning for both high speed and stationary 3D part inspection.

THE DEFINITION OF FACTORY SMART

WEB ENABLED

- Built-in web server, no separate software required
- Use a standard web browser for setup and control
- Easy-to-use, intuitive, multi-language interface
- View real-time data on any computer, any OS

APPLICATION READY

- Built-in measurement tools, no coding necessary
- Easy setup allows real 3D measuring in minutes, not days
- Tag and track parts for sorting and rejecting defects right from the sensor
- Use as a single sensor, dual sensor system, or scale up to a network of sensors
- Measure profiles or volumes and detect surface patterns all with the same sensor

FLEXIBLE

- Available in single point profile, line profile and snapshot technologies
- Choice of 2M, 3R, and 3B laser classes
- Open source SDK for custom application development
- Gocator Development Kit (GDK) for custom firmware development
- Emulator for simulation of pre-recorded data sets

HIGH PERFORMANCE

- Scan rates up to 32,000 Hz
- Micron resolution with large field of view
- Gigabit Ethernet real-time data delivery

FACTORY PRE-CALIBRATED

- Delivers real world coordinates, right out of the box
- Highly accurate assembly process for consistent, reliable, and precise measurement

RICH I/O

- Interface with your existing control systems, including PLCs
- Choose how you want to trigger and scan
- Select Ethernet, digital, analog, and/or serial data output

COMPACT FOOTPRINT

- Easily fits into small spaces
- Can be used on robotic arms
- Fits your application without costly modifications

#FactorySmart

MORE THAN JUST A SENSOR

THERE'S A COMPLETE INSPECTION ECOSYSTEM INSIDE EVERY GOCATOR.

The smartest sensor on the planet is the ultimate inspection platform — masterfully combining 3D data acquisition, measurement and control with revolutionary extensibility and a fully integrated user experience.

Multi Point

Vision

Snapshot

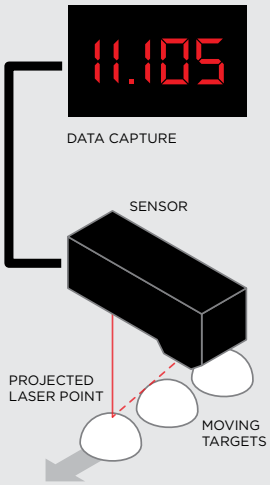
SMART
3D ACQUISITION

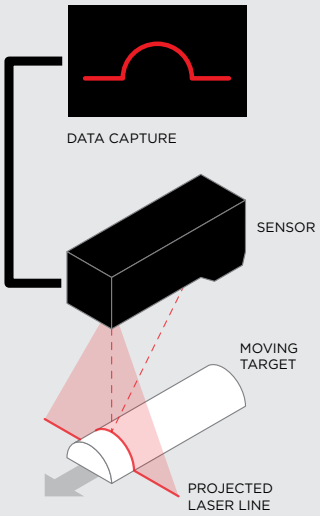
CORE 3D SCANNING TECHNOLOGIES

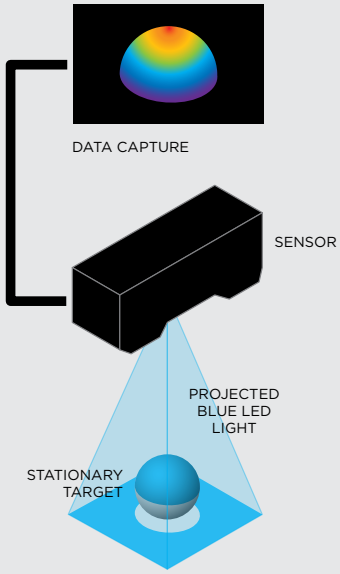
SINGLE POINT PROFILE SENSORS
Laser Distance Profile Triangulation

LINE PROFILE SENSORS
Laser Line Profile Triangulation

SNAPSHOT SENSORS
Stereo Full-Field Structured Light







HIGH-SPEED POINT PROFILING

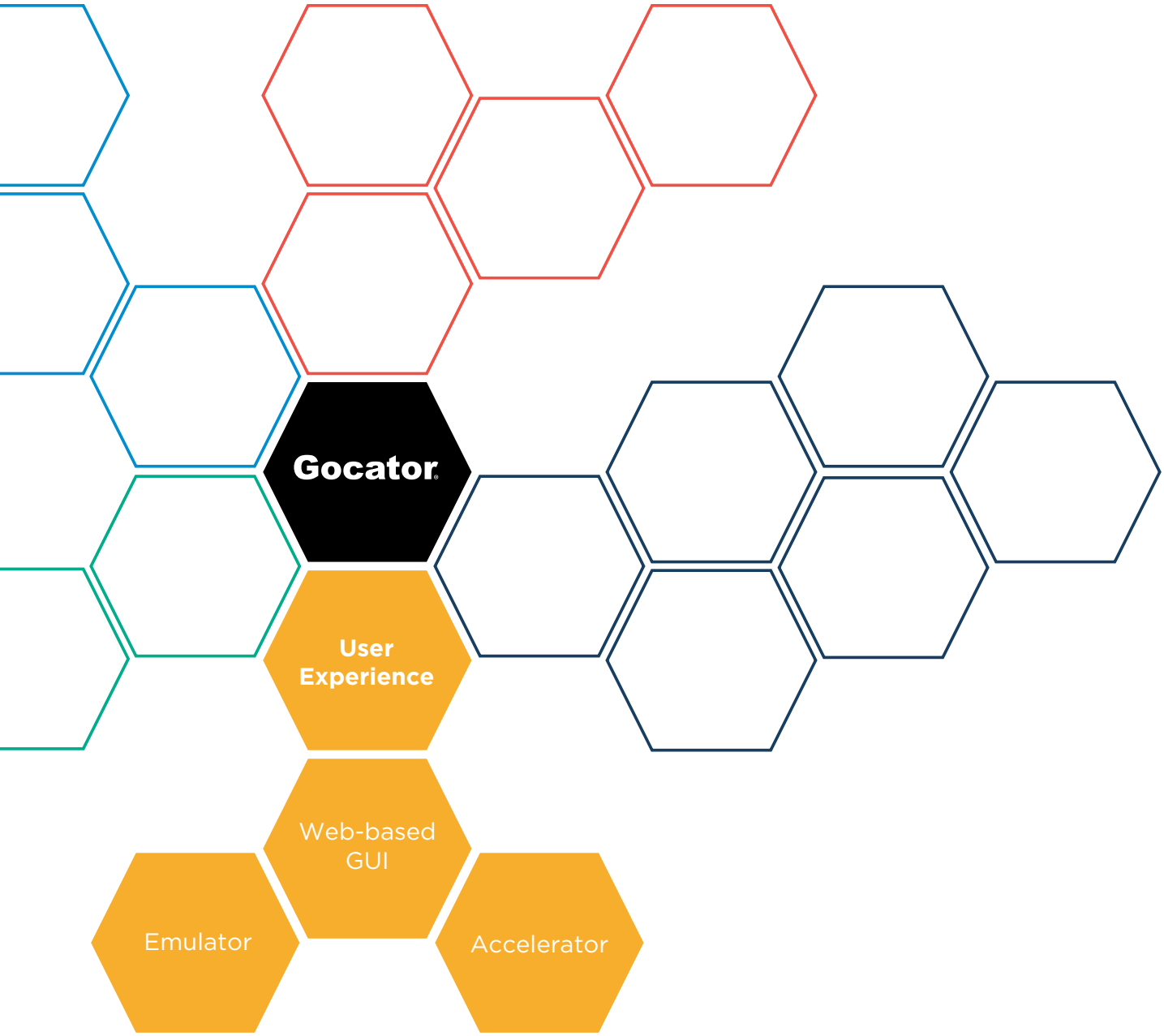
Gocator Single Point Profile Sensors are high-speed (32 kHz) single point measurement devices capable of profiling along the direction of part travel or inspecting displacement of a fast moving process. Ideal for contour analysis of parts moving at very high speed, these point profilers are unique all-in-one solutions to many applications.

THE ORIGINAL 3D SMART SENSOR

Gocator Line Profile Sensors measure a cross-sectional shape. Cross sections can be collected to form 3D point clouds representing discrete whole parts. A profile sensor can measure shape of very small (10 mm) to large width objects (1.5m) moving at high speed. The sensor can also simultaneously output calibrated 2D intensity images for use with common 2D imaging libraries.

WORLD'S FIRST ALL-IN-ONE SNAPSHOT SENSOR

Gocator Snapshot Sensors are the first family of 3D smart sensors to combine full-field 3D point cloud acquisition using fringe projection with 3D measurement tools for specific 3D features. These sensors are ideal for inline inspection like in robot pick and place applications where objects are momentarily stationary.

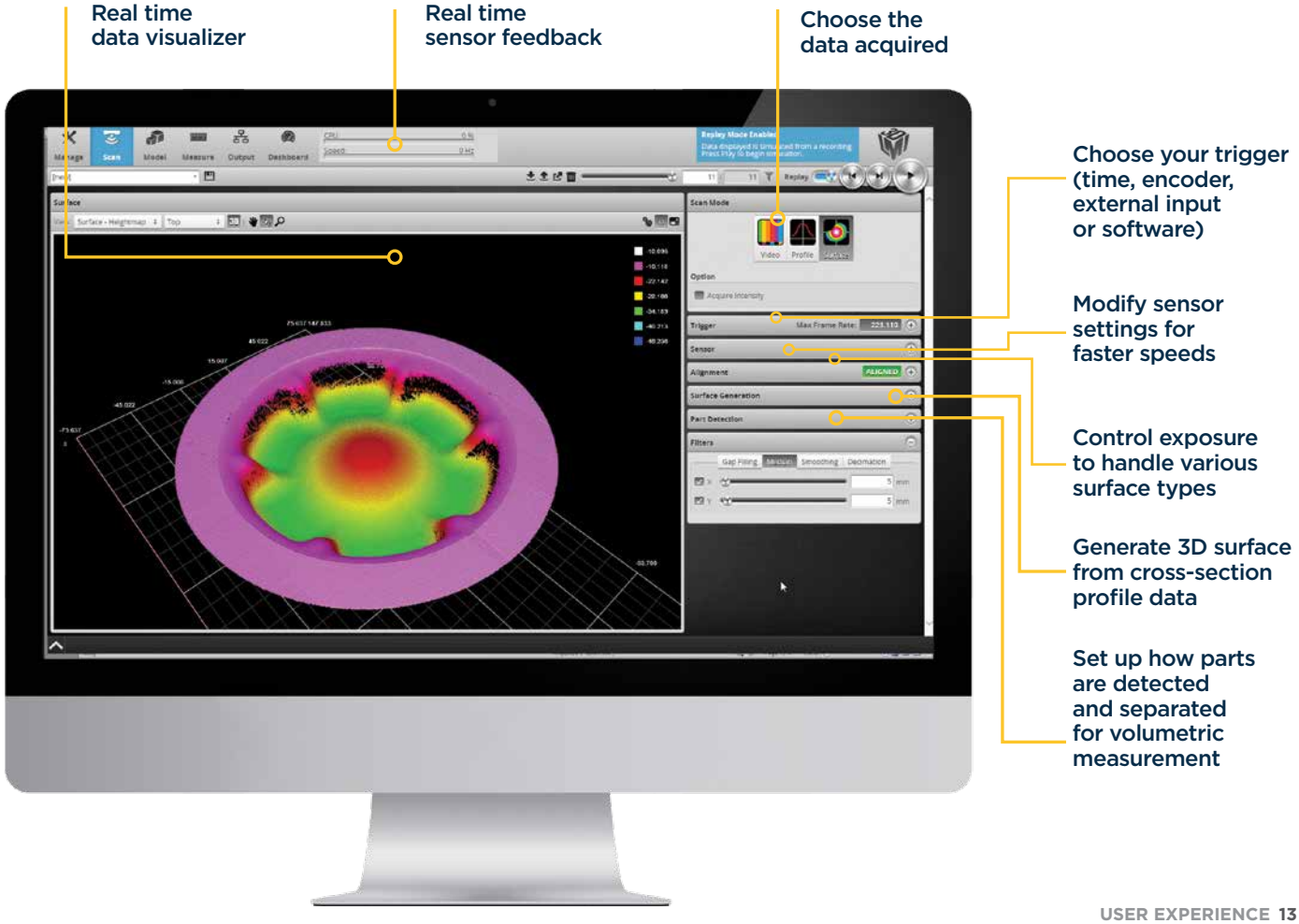


INTUITIVE AND INTEGRATED **USER EXPERIENCE**

SIMPLE SETUP

Setting up your Gocator is fast, easy and trouble free.

- Use your favorite web browser to access and control the Gocator
- Multi-language ready for non-English speakers to set up and fully utilize
- With a few mouse clicks, you can set up Gocator to work within your control system
- Intuitive control panels make setup fast and easy



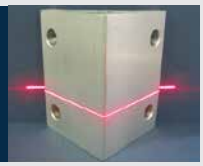
ADVANCED CONNECTIVITY

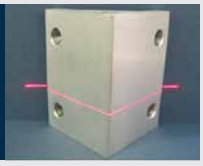
Connectivity is essential to Gocator's success in the integrated environment of automated inline inspection systems.

- Onboard web server allows for fast setup on any computer
- Connect via industry standard Ethernet
- Simple cabling for inputs, outputs and power
- True standalone operation allows you to set up and walk away
- Modbus TCP, EtherNet/IP™, and simple ASCII string support for "plugging into" PLCs or robot controllers
- No hidden costs or additional hardware required

OPTIMAL EXPOSURE SETTINGS

Exposure is key to achieving optimal measurement results. Gocator sensors provide up to three exposure modes for scanning different types of target surfaces. Adjusting Gocator's exposure is as easy as dragging a slider.





Single Exposure

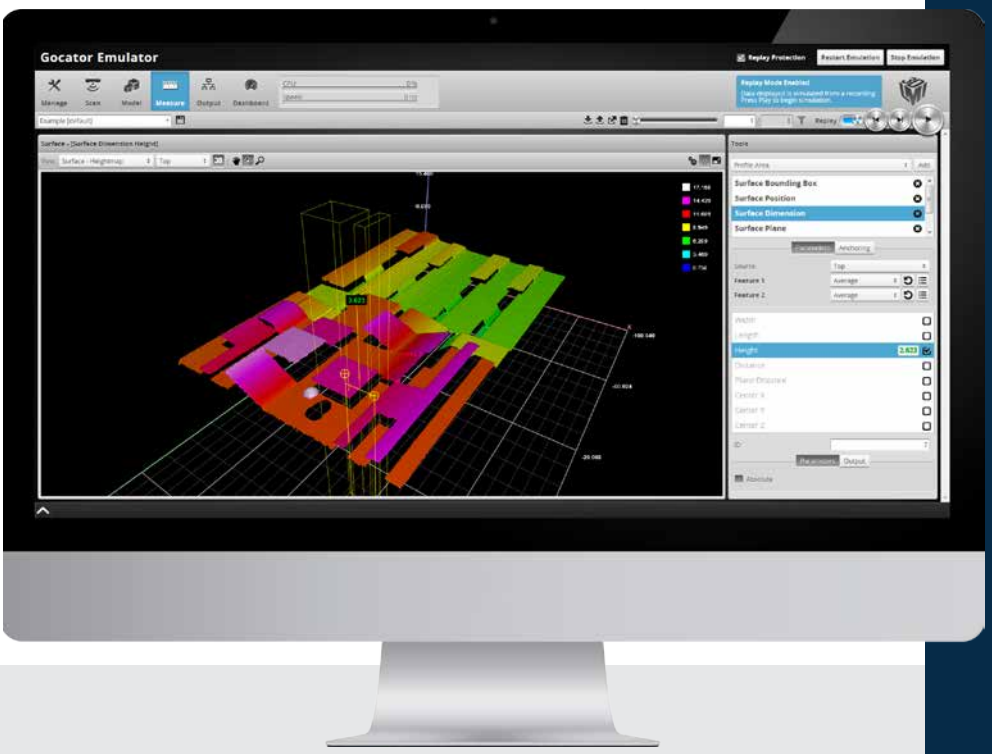
Single Exposure is ideal for scanning parts with similar reflectivity.

Dynamic Exposure

With Dynamic Exposure, Gocator adjusts exposure automatically between a min/max range to handle varying surface reflectivity between one scan and the next.

Multiple Exposure

Gocator creates a single laser profile from multiple exposure settings, making it easy to measure objects with both light and dark surfaces simultaneously.



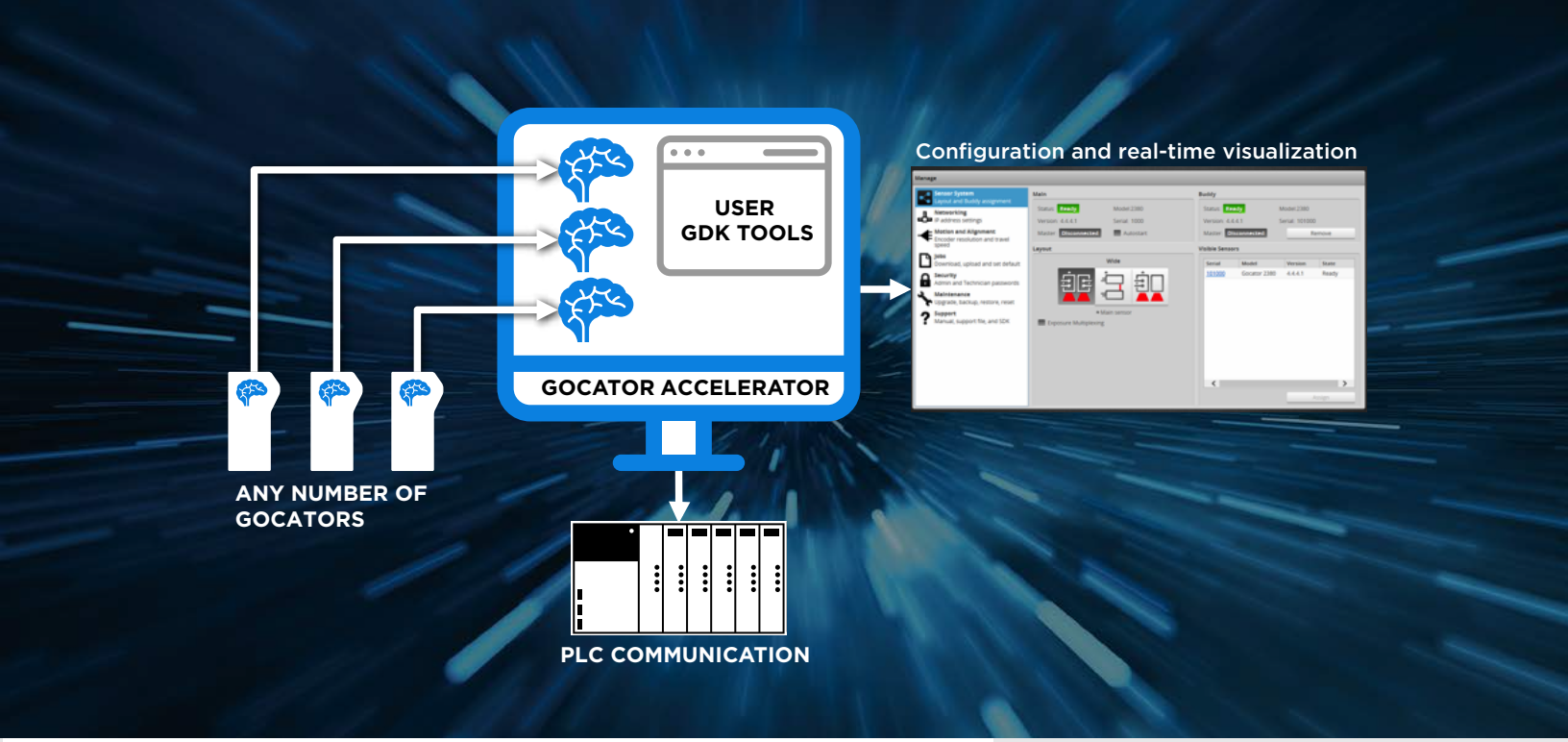
GOCATOR EMULATOR

The Gocator Emulator is a standalone application that allows you to run a “virtual” sensor using pre-recorded data without the need for a physical sensor.

In a Gocator virtual sensor you can test preset recordings and jobs and even evaluate new features.

You can also use a virtual sensor to familiarize yourself with the overall Gocator Firmware interface, rather than taking a physical device off of the production line and going through the process of setting up and testing it.

- Use all the Gocator functionality, including measurement tools and part matching on recorded data — in a virtual web-based environment
- Analyze and create measurement solutions on data recorded from a real sensor in true production conditions
- Determine issues with current sensor configurations, then design and test improvements in a safe environment prior to deploying the solution on an actual sensor
- Develop fully integrated solutions in a stable offline environment
- Includes online version!

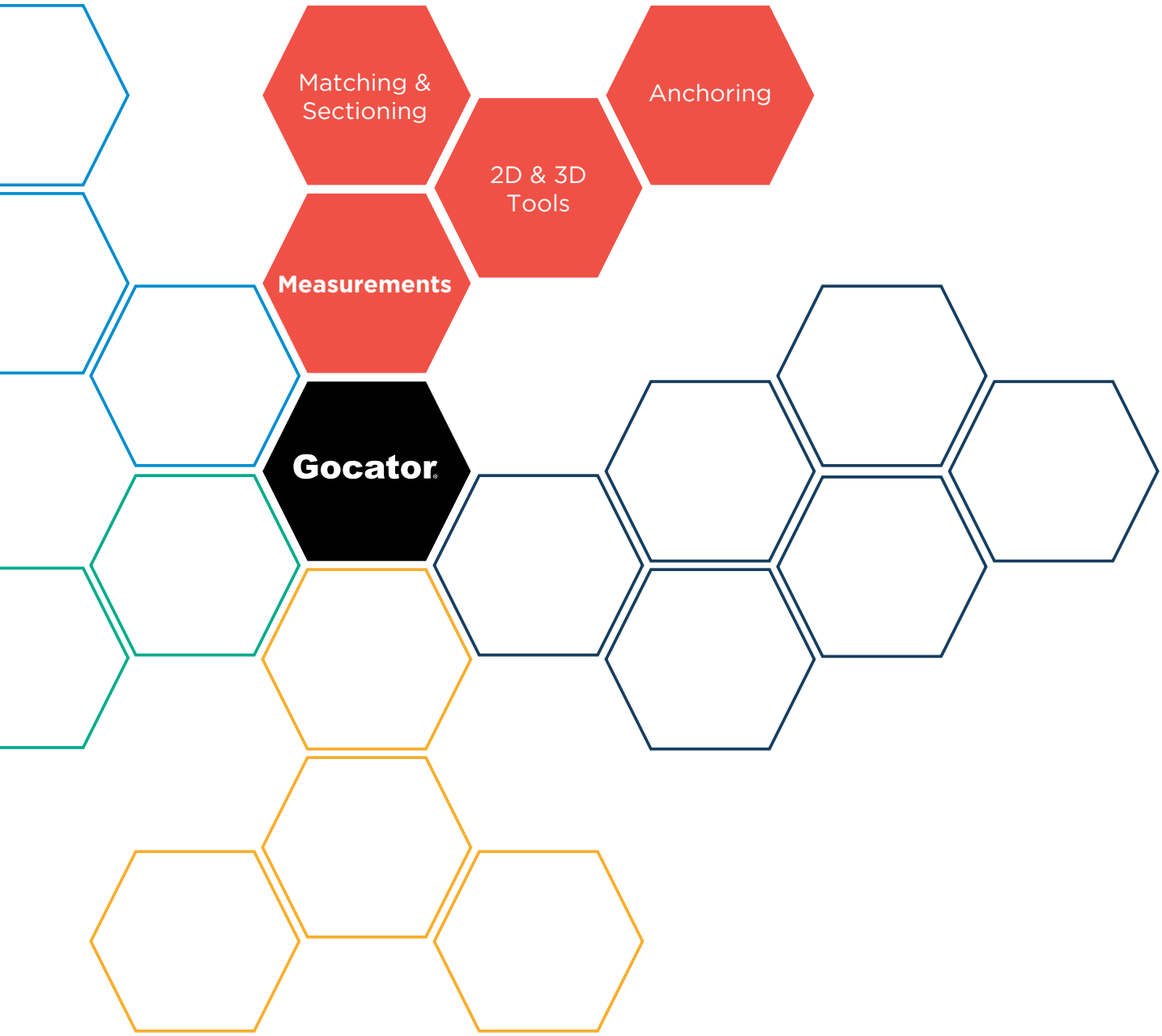


GOCATOR ACCELERATOR

The Gocator Accelerator is a Windows PC application that allows you to add the data-processing power of one or more PCs to your inspection solution.

Setup is easy as selecting a Gocator for acceleration and launching a web browser session on your PC to perform local acquisition, measurement, and control.

- Reduce cycle times
- Remove memory limitations
- Handle large 3D point clouds
- Configure and operate multiple networked Gocators

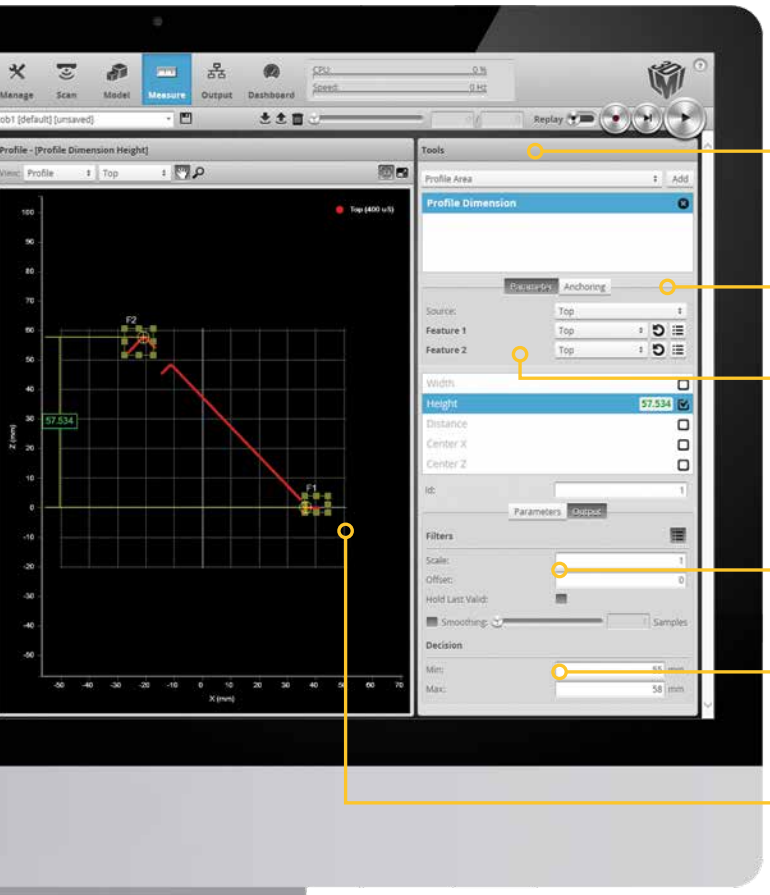


ROBUST **MEASUREMENT**

SPEED AND PRECISION

Measurement accuracy is critical to making correct pass/fail decisions and ensuring product quality and throughput.

- Powerful built-in tools turn 3D data into real-time measurements with pass/fail decisions
- Select the type of measurement and see live results with pass/fail limits
- Fixturing maintains valid measurements by tracking part movement
- Record and playback features allow refinement of tolerances or export to CSV for later analysis
- Output filtering settings add extra stability to measurements



Choose your measurement tools

Enable anchoring to track part movement

Choose feature points to locate key measurements

Setup output filters to improve stability

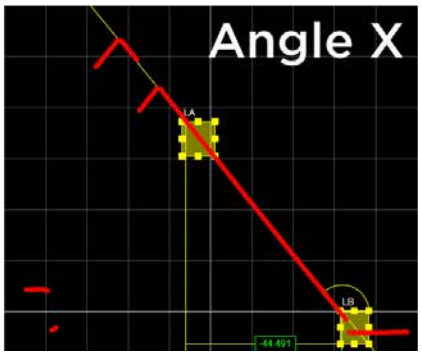
Measure against minimum and maximum thresholds to quickly generate decisions

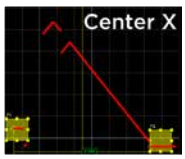
Resize and move search areas to easily select where and what to measure

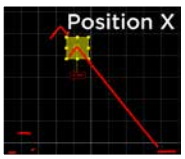
POWERFUL BUILT-IN TOOLS

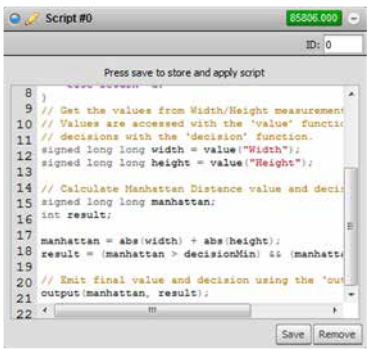
Gocator's built-in tools provide a full suite of measurement capabilities to solve a wide range of inspection challenges.

- No need for highly specialized knowledge, intensive training or writing of code. Just point, click and measure
- Write your own script to perform tailored calculations using measurement results
- Download free firmware updates to access new Gocator functionality









PROFILE MEASUREMENT

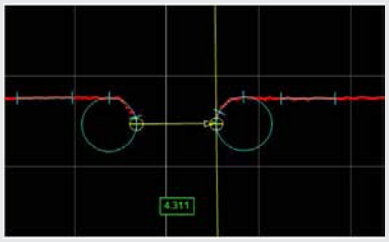
Gocator's profile tools detect and compare feature points or fit lines found within laser profile data. Measurement values are compared against minimum and maximum thresholds to yield accurate control decisions.

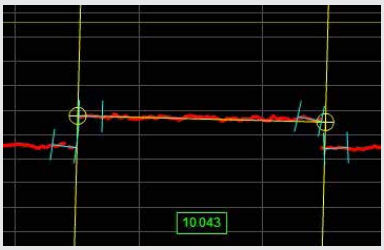
PANEL (GAP & FLUSH) TOOL

The panel tool automatically carries out gap and flush measurements. Gap measurement provides the distance between the edges of two surfaces, and flush measurement provides the flushness between the edges of two surfaces. This is a powerful tool used in the automotive industry.

STRIP TOOL

The strip tool measures the width of a strip and lets you add multiple measurements of the same type to take data and set decisions for multiple strips. For example, if a rubber target has three strips, you can configure Gocator to measure the width of the first and the third strips using the same strip tool.





Other Gocator profile measurement tools include:

- Area
- Bridge Value
- Circle
- Dimension
- Groove
- Intersect
- Line
- Position
- Tilt

3D SURFACE MEASUREMENT

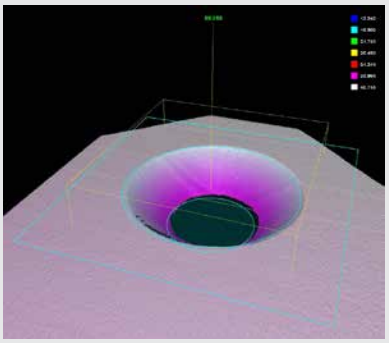
3D surface measurement involves measuring surface properties such as volume and height at a certain position. Gocator's volumetric tools have the ability to operate on the entire surface or the full object or within a region of interest at a given position in relation to the object's surface.

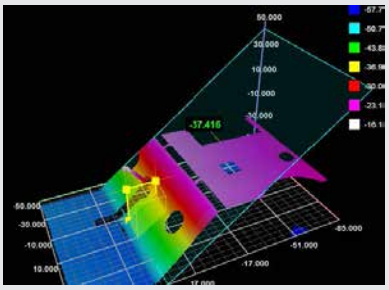
COUNTERSUNK HOLE TOOL

The countersunk hole tool automatically locates a countersunk circular opening on the object surface and provides measurements to evaluate its characteristics — including position (X, Y, and Z), outside radius, bevel angle and depth.

SURFACE PLANE TOOL

The Plane tool provides measurements of the surface angle X, angle Y and offset Z with respect to the alignment target. The results of the Plane Angle X and Plane Angle Y measurements can be used to customize the tilt angle in the hole, opening, and stud tools.





Other Gocator profile measurement tools include:

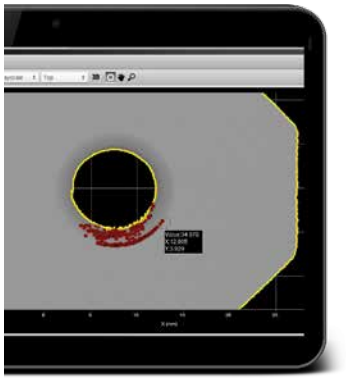
- Bounding Box
- Hole
- Opening
- Position
- Stud
- Volume

REAL-TIME VISUALIZATION

Powerful real-time visualization provides instant access to high-precision 3D images of any scan target.

PART MATCHING

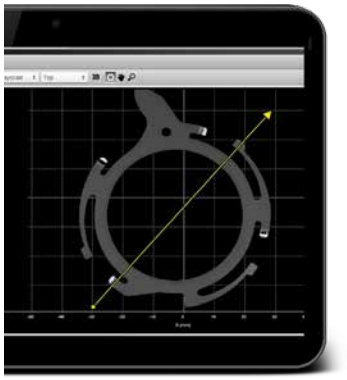
Accurately inspect parts regardless of their orientation on the assembly line



- Edge Matching capability automatically performs part realignment before applying Gocator's built-in measurement tools
- Eliminates the need to mechanically realign parts that are presented out of position
- Parts can move through the sensor's field of view in any rotation and Gocator will automatically re-align and inspect them

PART SECTIONING

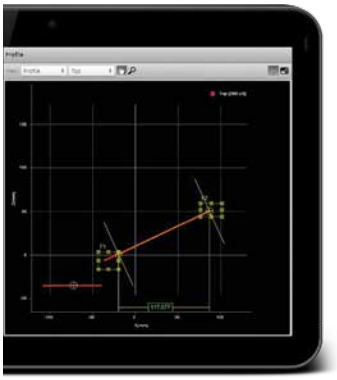
Extract a cross section from a 3D model of a part and perform advanced measurements



- Ability to scan in surface mode to produce 3D shapes
- Allows you to see the cross-section of a full 3D model
- Ideal for determining and measuring cut lines

ANCHORING

Track the movement of parts within the field of view of the sensor and correct for variations in the height and position of parts



- Part movement is calculated as an offset from the position of a measured feature
- Correct the positions of measurement regions for other measurement tools
- Ensure the regions used to measure features are correctly positioned for every part
- Flexible anchoring supports multiple anchoring sources within the same setup
- Solve complex applications with part position and size variations
- No limit to the number of anchors used in an application

3D + 2D FUSION

Gocator combines 3D with 2D technology for a more robust inspection system.

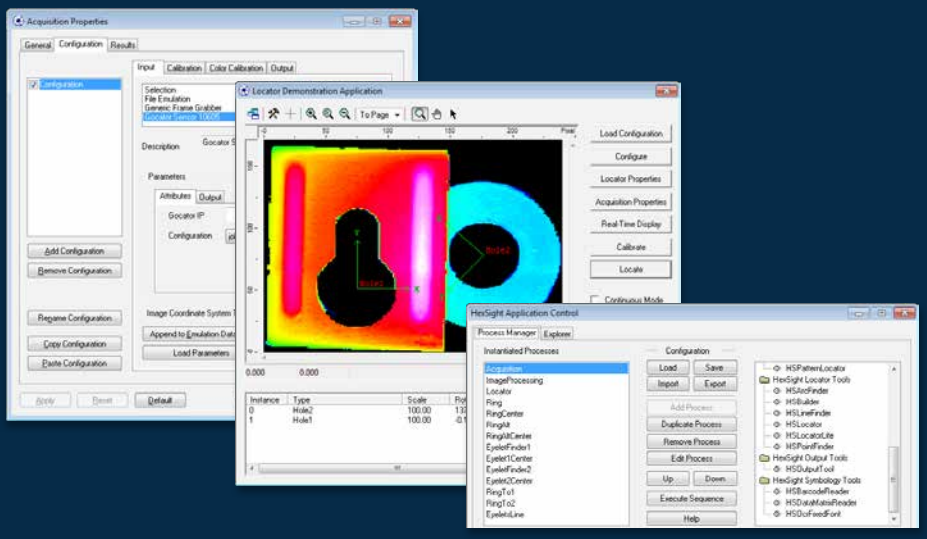
INTENSITY OUTPUT (ACQUIRE INTENSITY)

Use one sensor to perform both 2D vision & 3D measurements

- Produces a calibrated, grayscale image from sensor light reflected off the part
- Easily integrate 2D image processing libraries to identify defects or patterns on a surface

HEXSIGHT

ROBUST 2D VISION LIBRARIES



HIGH ACCURACY 2D PART LOCATION AND METROLOGY

HexSight geometric part location technology provides flexible and robust contour-based 2D pattern matching to locate parts and features regardless of their scale or orientation.

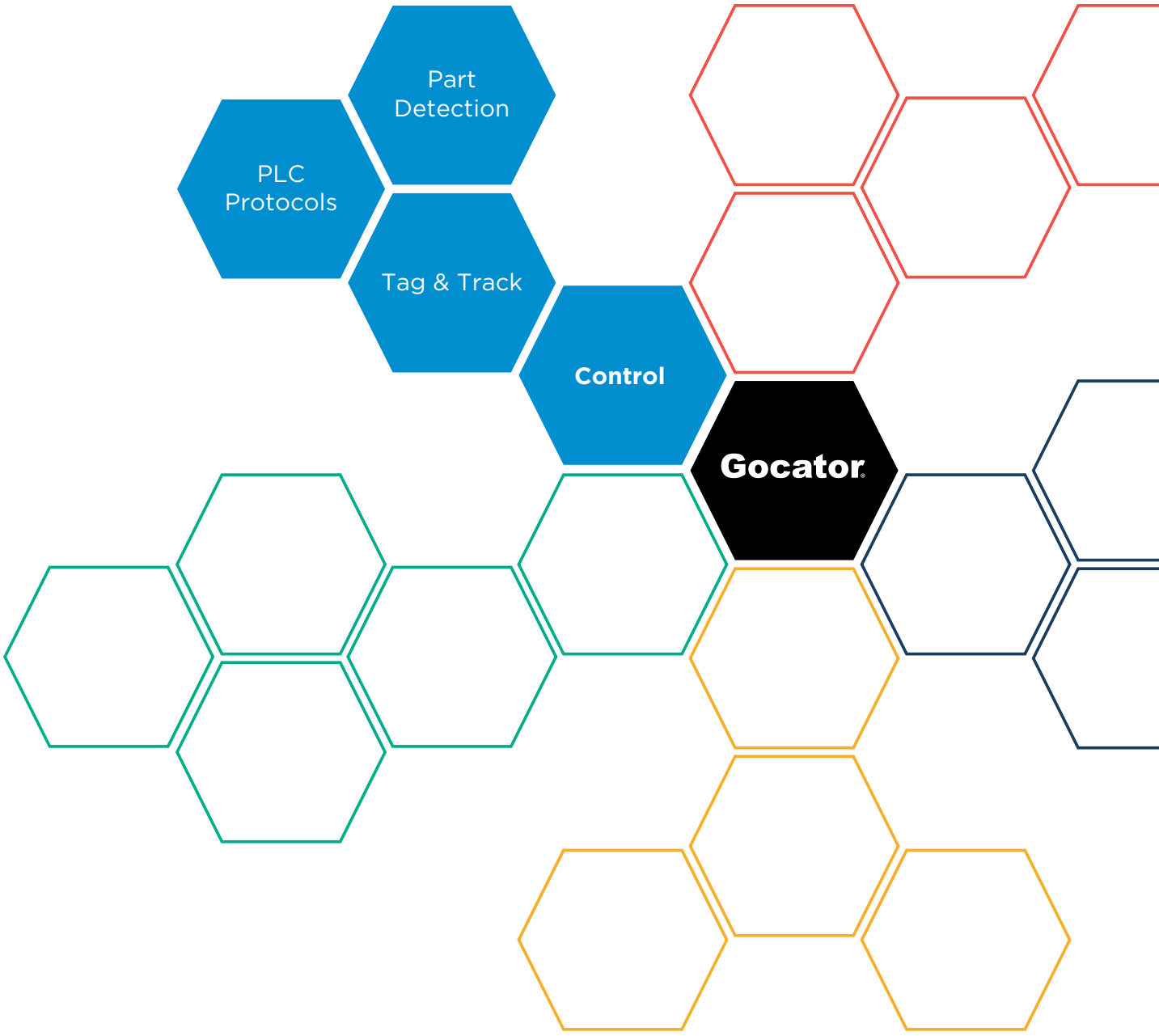
COMBINE 2D AND 3D FOR A MORE COMPLETE INSPECTION PROCESS

HexSight and Gocator work seamlessly together to create a more robust inspection system. With HexSight you can combine 3rd party machine vision camera images for 2D inspection with Gocator's 3D height maps for 3D measurement.

SEAMLESS INTEGRATION WITH GOCATOR

HexSight is tightly integrated with Gocator so acquisition of 3D point clouds and 2D intensity images can stream into inspection processing on a PC to produce results that are scheduled on Gocator hardware for output.

* Included at no cost with every Gocator 3D smart sensor.



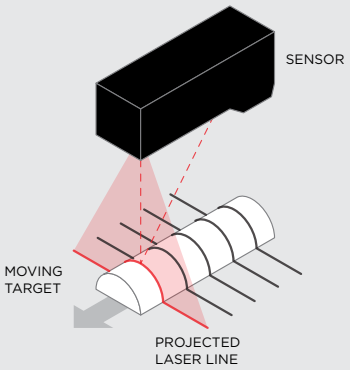
MAXIMUM **CONTROL**

TRIGGER MODE

Triggers are “inputs” to the sensor that prompt the sensor to acquire data.

ENCODER + CONVEYOR

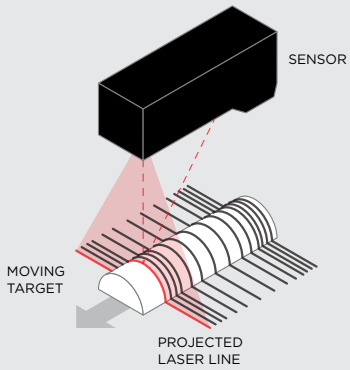
For profile measurements at a uniform spacing



- An encoder can be connected to provide triggers in response to motion
- Encoder triggering is used with conveyors to perform profile measurements at a uniform spacing
- The speed of the conveyor can vary while the object is being measured; an encoder ensures that the measurement spacing is consistent, independent of conveyor speed
- Gocator supports three encoder triggering behaviors: track backward, ignore backward and bi-directional

TIME + CONVEYOR

For profile measurements at a fixed frequency



- Gocators have an internal clock that can be used to generate fixed-frequency triggers
- The external input can be used to enable or disable time triggers
- Time triggering can be used instead of encoder triggering to perform profile measurements at a fixed frequency

Other Gocator triggers include:

- External Input
- Software

TOTAL SENSOR CONTROL

Gocator provides powerful control tools to ensure the highest precision outcomes.

PART DETECTION

Detect individual parts and build a 3D model ready for measurement

- Save system cost and reduce complexity with Gocator's all-in-one whole part capability
- Auto detects and separates multiple parts appearing simultaneously
- Use gap filling to connect related parts into a single part

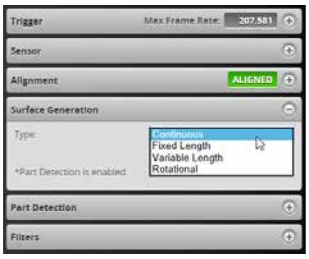
TAGGING & TRACKING

Tag and track parts to make precise and timely downstream control decisions

- Each part is tagged with a decision and tracked by its encoder position until the appropriate downstream location is reached
- The sensor then activates the appropriate control decision (e.g., sort, accept or reject via deflection gate) at the precise time
- Built-in control logic eliminates the unnecessary cost of adding PLC systems

SURFACE GENERATION

Leverage a number of different methods to create a surface or a 3D point cloud



- Includes continuous (part detection), fixed length (sequential, external input), variable length (external input) and rotational (ticks per revolution, Z-index to re-order data) surface generation
- Provides greater control and flexibility for supporting common industry scanning methods such as conveyor, web, robotic, and rotational setups

PART EDGE FILTERING

Built-in capability to remove noise around the perimeter and interior of scanned surfaces or parts

- Noise filtering increases repeatability and accuracy of 3D measurements
- Allows measurement regions to be placed with high precision, without any noise interference

FLEXIBLE INPUT/OUTPUT

Output measurement results to analog, digital, Ethernet and PLC protocols. Quickly and easily integrate with Halcon, LabVIEW and other common vision libraries such as HexSight.

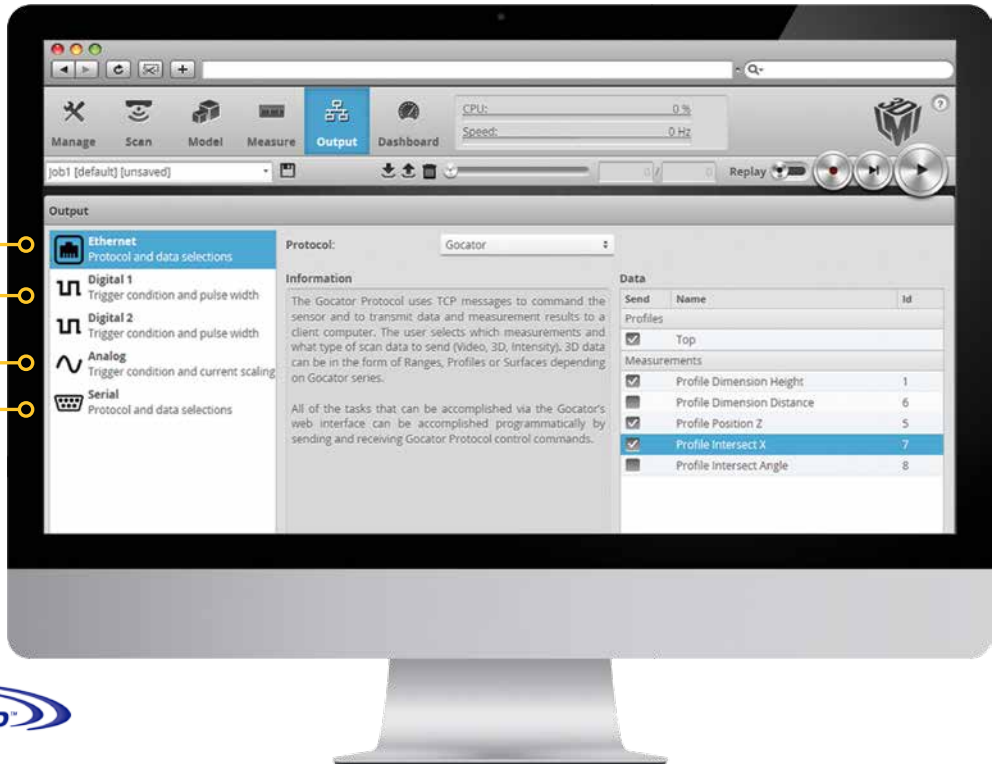
- Simply click on your choice to enable various outputs and decisions
- Gocator has the flexibility to simultaneously output data and decisions to a wide variety of I/O
- Tag and track parts for reject or sorting at a later time, or position with scheduled outputs
- Easily communicate with your existing hardware including PLCs and robot controllers via Modbus TCP, EtherNet/IP™ or custom ASCII strings

Send profile and measurement information using binary, ASCII, and standard PLC protocols via Ethernet

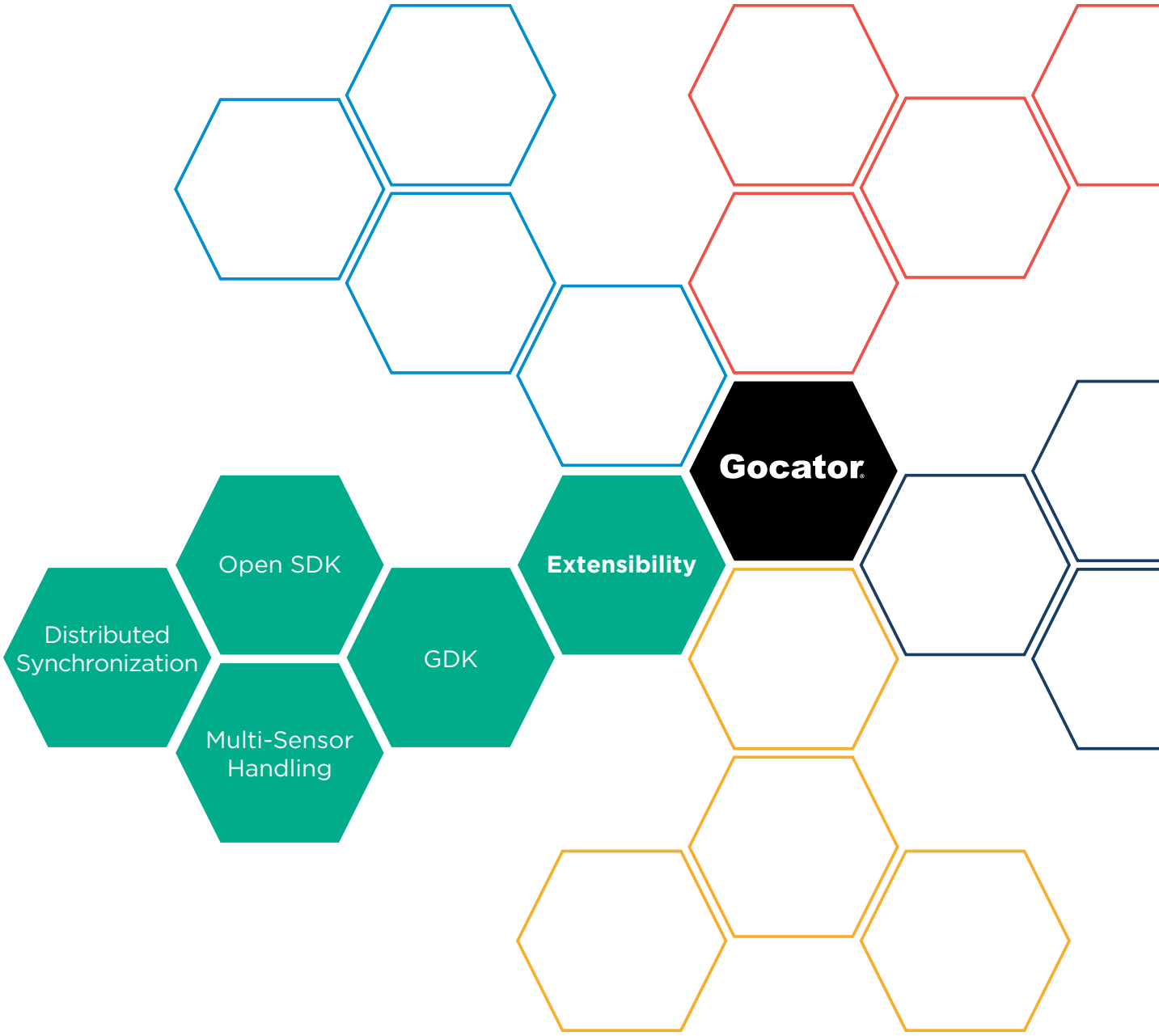
Control simple external devices with digital outputs

Convert measurement values and decisions to analog output signals

Transmit data and decisions via RS-485 serial output channel



Modbus EtherNet/IP™



REVOLUTIONARY **EXTENSIBILITY**

DUAL SENSOR SYSTEMS

Easily create a dual sensor system to increase 3D scan coverage.

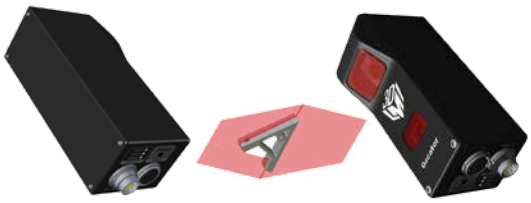
- Gocator automatically recognizes a second sensor called a “Buddy”
- Dual sensor mode seamlessly combines profile data from both Main and Buddy sensors as if they were one
- Dual Sensor Systems use a single GUI to configure, measure, make decisions and show results

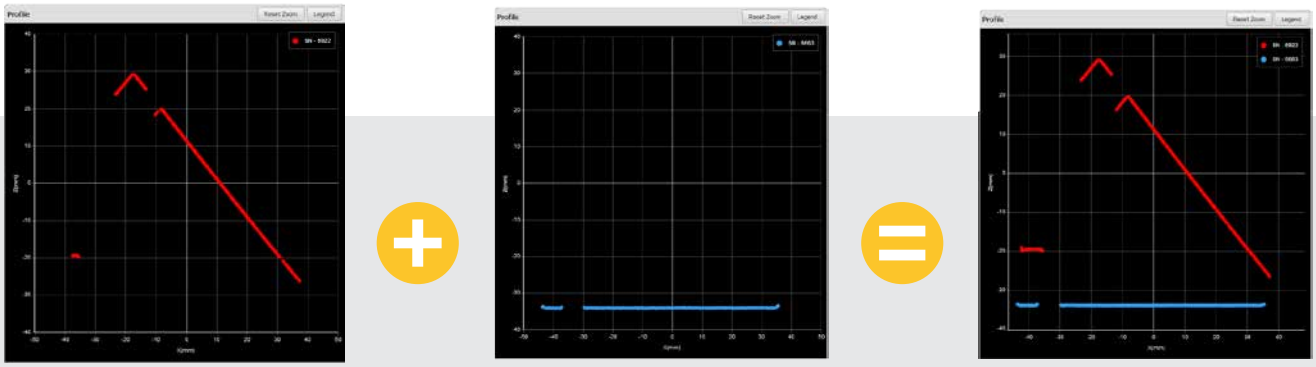
WIDE ORIENTATION

Mount a Main (left) with a Buddy (right) to measure objects that are wider than a single sensor’s field of view. Sensors can be angled to avoid occlusions

OPPOSITE ORIENTATION

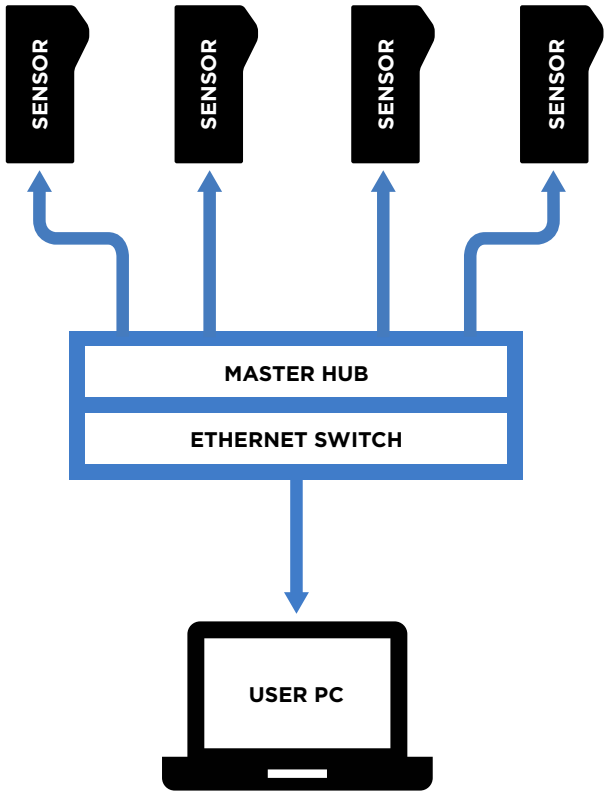
The Main and Buddy perform top and bottom differential measurements to calculate true thickness when the object cannot be referenced to a known surface such as a conveyor





MAIN BUDDY COMBINED

MULTI-SENSOR NETWORKING



When an application calls for more than a dual sensor system, multiple sensors can be networked using an LMI Master Hub.

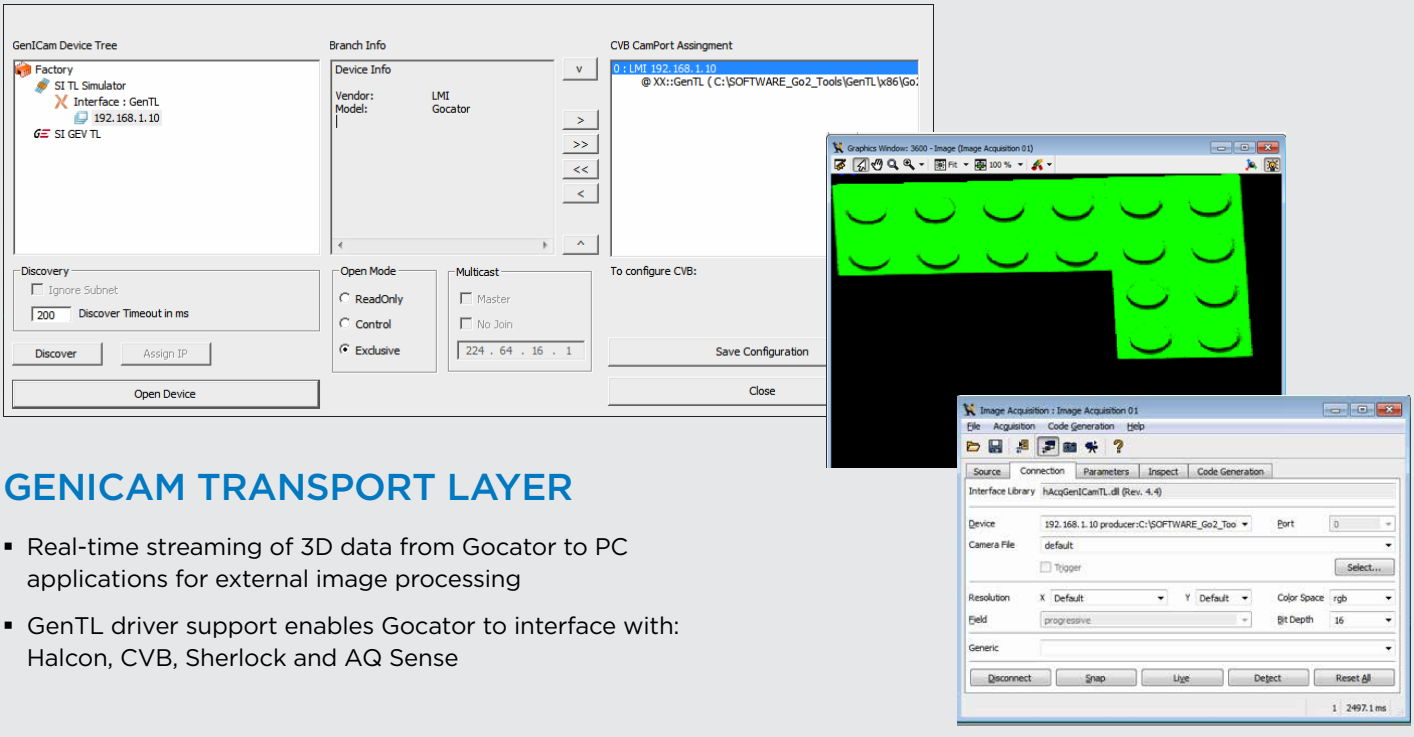
- The Master product line offers models that support 4, 8, 12, or 24 Gocator connections
- Masters provide power, laser safety and distributed synchronization (time, encoder, external trigger)
- Each Gocator transmits 3D profile data to the host computer through standard Ethernet switches

EXTENDED CAPABILITIES

Benefit from features that extend Gocator's functionality and allow you customize your sensor to meet specific application requirements.

OPEN SOURCE SDK

- A single C-based SDK to control, acquire and manage any Gocator
- Unified library for all Gocator technologies - learn it once and use it everywhere
- Compile and execute on any target environment



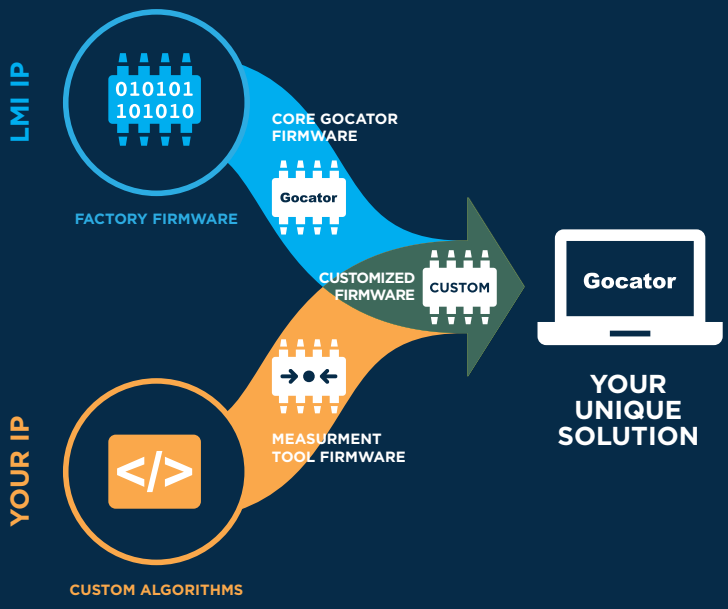
GENICAM TRANSPORT LAYER

- Real-time streaming of 3D data from Gocator to PC applications for external image processing
- GenTL driver support enables Gocator to interface with: Halcon, CVB, Sherlock and AQ Sense

GOCATOR GDK

The GDK allows for custom development of proprietary measurement algorithms that run directly on Gocator sensors, transforming an off-the-shelf sensor into a fully customized device based on specific application needs.

- Extend your existing set of measurement tools and make specialized measurements for applications with unique requirements while protecting your IP
- Produce optimized custom firmware builds with blazing fast performance
- Use custom solutions on a variety of different sensors, all on a single platform
- Output measurement results to a wide set of Gocator outputs such as analog, digital, Ethernet and PLC protocols
- Run your customized measurement tools in the Gocator Emulator
- Easily integrate with the Gocator SDK, Halcon, LabVIEW and other common vision libraries



The Gocator Development Kit (GDK) is a powerful platform providing extensibility to the Gocator Firmware.

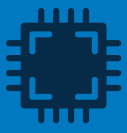
NATIVE DRIVER

- Real-time streaming of 3D data from Gocator to HexSight and NI LabVIEW
- Export 3D data from Gocator in CSV or ASCII format

NOW THAT'S SMART.

THE LMI ADVANTAGE

What makes LMI different from catalog-based companies is that **our sole focus is 3D technology**. Four pillars support this specialized approach and drive our commitment to accelerate customer profitability by delivering the highest performing and most cost-effective 3D scanning and inspection solutions.



Chip Level Engineering

LMI's core strength is engineering at the chip level, which means we design and build the critical components that go into our 3D products. This allows us to provide exceptional quality, pricing and performance.

OEM Business Model

LMI's business is built on the OEM model. This model is defined by close and long-lasting relationships with our partners, allowing us to research, develop and continuously provide flexible and effective solutions that meet real-world business and application needs.

Simple User Experience

LMI is dedicated to developing 3D scanning solutions that deliver simple and intuitive user experiences, with the promise of ongoing feature development and exceptional customer service.

Custom Solutions

Our ability to provide customers with solutions tailored to their individual application needs is what separates LMI from the rest of the field. In our 35 years we have designed a large number of customized solutions for some of the most demanding 3D measurement applications.

LMI provides OEMs with a flexible 3D technology platform that can be customized to meet their unique business demands. Unlike our competitors, 3D scanning and inspection is all we do, and it is this specialized knowledge and experience that helps drive profitability, reduce time to market, and open up new possibilities for our clients.

TERRY ARDEN, CEO

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BROCHURE_Gocator_2.0