Structured light inspection solutions

High-accuracy, high-speed optical 3D measurement technology

reddot winner 2024

Advanced camera-based 3D measurement

Scanning systems based on high-speed photography are intrinsically fast in terms of data collection, offering large measurement volumes that can capture entire part profiles in fractions of a second. Whether this is turned into 3D model data with the referencing of physical targets or projected light patterns, there are few faster ways of inspecting surfaces and features.

Hexagon's range of structured light scanning systems build on this intrinsic speed with complex processing algorithms that turn images into data in an instant.

Contents

Structured light scanners

Peak performance in optical 3D measurement

Structured light scanning is a well-established and highly reliable technology for three-dimensional surface acquisition. Even complex surface geometries are captured swiftly and at a high level of resolution and accuracy with this advanced non-contact optical 3D scanning technique.

Owing to their exceptional mechanical and thermal stability, Hexagon's range of structured light scanner systems can be employed across a multifaceted array of applications. Extremely sturdy by design, these two-camera systems are renowned for their extraordinary combination of ruggedness and precision, allowing them to meet the challenges of modern metrology from the most sterile quality room to the dustiest shop floor.

Hexagon structured light scanning technology works with the dedicated OptoCat software platform, designed to quickly transform high-quality measurement information into precise digital mesh data, as well as directly within third-party metrology software through plug-ins based on the SLS SDK.

Introduction to structured light

How structured light scanning works

Structured light scanning – sometimes referred to as white light scanning, blue light scanning or simply optical 3D scanning – is a method of measuring objects by using at least one high-definition camera to capture light patterns projected onto a surface and analysing the shape of the captured projection.
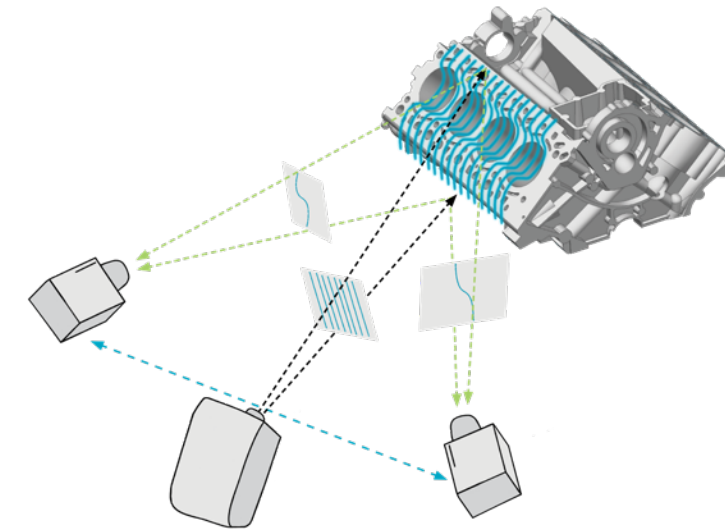
1. Projecting

A special projector casts a specifically designed type of light pattern onto the measurement object. Hexagon's structured light scanning technology uses a cutting edge type of fringe projection pattern, designed to deliver the most accurate possible scans.

2. Capturing

Each structured light scanner is equipped with at least one digital camera units that capture this projection at predefined viewing angles. The entire measurement process takes between a few seconds and several minutes and is completed as soon as images from all sides of the object have been captured.

3. Calculating

The resulting images are then analysed based on the principle of spatial image triangulation and used to deriver highly accurate dimensional information about the measurement surface. Individual scans from different directions of the measurement object are then aligned by geometry or with the aid of targets placed around the object before measurement. Subsequently, all individual scans are merged to a single triangle mesh.

4. Reporting

Measurement results are subsequently collated into detailed reporting within the metrology software package being used, whether that be a dedicated platform from Hexagon or a third-party inspection software accessible through a dedicated plugin.

SmartScan VR800

Get the full picture | Focus on what matters

The SmartScan VR800 fundamentally changes the conversation on structured light scanning. With a patented dual stereo camera plus mechanical optical zoom projection unit setup, the need for multiple base lengths, complex lens changing and frequent recalibration are now a thing of the past.

Get the resolution and coverage demanded the moment it is needed, no hand tools required. With the VR800, simply change the settings through the software to alter the size of the measurement area or the resolution of the measurement results. The system is also set up for automated inspection system integration.

Key advantages

- Unique optical zoom allows scanning with variable resolution and short scanning process times

- 80 MP camera power delivers extremely high resolution data across dual stereo camera setup

- Smart Zoom and Smart Resolution functions allow software to control resolution and measurement volume

- New high-productivity workflows based on multi-camera setup and zoom functionality

- Smart Snap function allows simultaneous measurement of high-resolution 3D data and capture of orientation data

- High-stability scanning thanks to custom carbon-fibre structure

- Ready for automated robotic inspection thanks to rigid design and high-speed data capture

- Accessories such as turntable and turn-tilt units allow for semi-automated scanning

- Combinable with photogrammetry systems

Resolution where you need it

Thanks to four separate camera units and a mechanical zoom projector, the VR800 has a unique variable resolution and coverage functionality. This allows the level of detail and the size of measurement volume to be selected and seamlessly adjusted within the inspection software in a matter of only seconds, with no need for exchanging optics or recalibration.

Ease of use to simplify workflows

The VR800's multi-camera setup delivers unprecedented new workflow opportunities that simplify the business of measuring with an optical 3D scanner. The ability to combine different resolutions into a single project with near simultaneous data capture has benefits both in terms of speed of data capture and in processing and analysis.

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SmartScan VR800

Breaking new ground with 80 MP camera power and patented optical zoom projection

What is so special about the SmartScan VR800? The use of a dual stereo camera setup and a mechanical zoom on the digital projection unit really stand the VR800 apart from the competition.

The scanner boasts an unprecedented 4 high-quality 20 MP digital camera units, allowing measurement coverage across a tight 320-millimetre diagonal inner measurement volume or a wide 800-millimetre diagonal outer measurement volume and X,Y resolution in object space starting at 49 microns.

Smart Resolution

The VR800 Smart Resolution function allows the user to change the data resolution while maintaining a constant measurement volume.

The user can switch in software between six different settings and combine data in a single project.

Three resolution options are available for each pair of cameras (5, 12 and 20 MP), delivering an X,Y resolution range of between 238 and 49 microns.

Smart Zoom

The VR800 Smart Zoom function allows the user to adjust the measurement volume and resolution of the scanner while maintaining 5 million data points for high-speed processing.

There are six measurement volume options – three for each camera pair. The largest has a diagonal of 800 millimetres, the smallest 160 millimetres – changing between them delivers an X,Y resolution improvement from 238 to 49 microns.

Smart Snap

The VR800 Smart Snap function puts the multi-camera setup to work in a different way that uses all four digital camera units to simultaneously collect both scan and orientation data. Target positions placed outside of the 3D scan area are snapped with support of an LED flash and used for orientation of the 3D scan data collected by the inner camera pair.

This combination significantly reduces the number of targets required, increases the target measurement volume and at the same time speeds up the whole scanning workflow.

Low resolution: 238, 179, 119 µm
800 mm
660 mm
430 mm
320 mm
250 mm
160 mm
High resolution: 98, 74, 49 µm
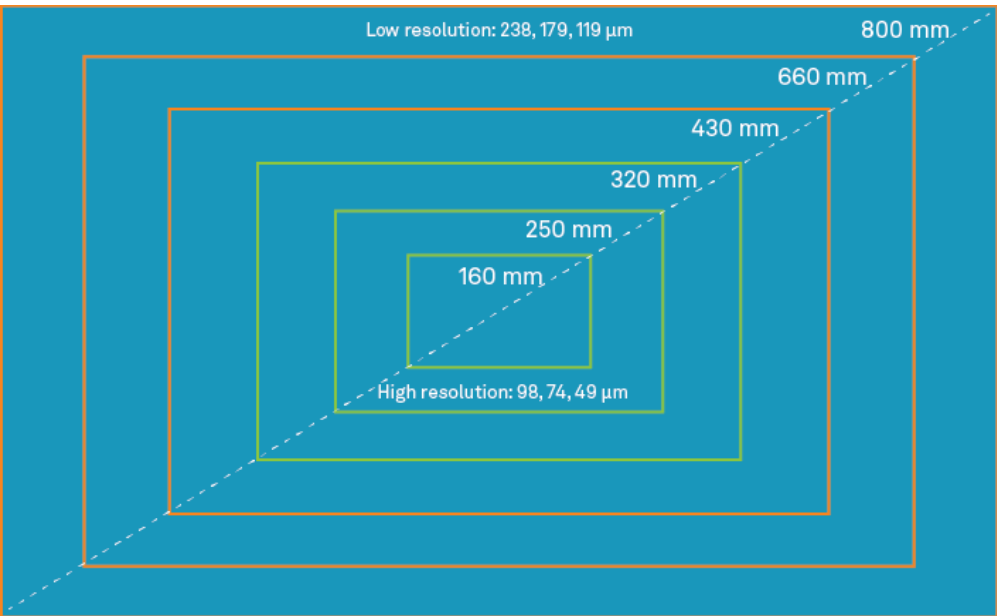
SmartScan VR800

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Automation ready

The SmartScan VR800 is designed with automation in mind, and is completely ready for integration within robot-based automated measurement systems.

The high-speed digital measurement capabilities inherent in the structured light scanning concept; the improved workflows that the VR800 delivers; exceptional carbon-fibre based structural stability: it all adds up to a unique automated inspection solution with massive potential for productivity and reliability benefits.

The VR800's variable measurement volume is of great advantage for automation use cases. Variable resolution allows changing the amount of detail that is captured throughout the scan process. The ability to adjust both resolution and measurement volume in the software avoids robot down time that would otherwise be required to change scanner settings.
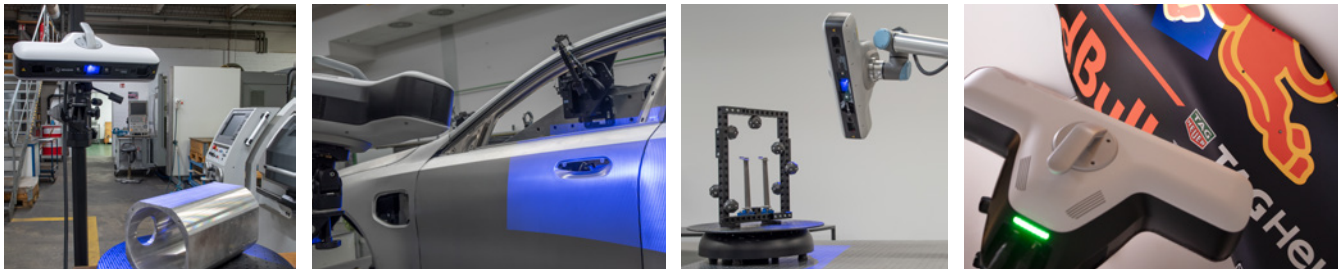
StereoScan neo

The benchmark in structured light scanning

The StereoScan neo combines superior resolution and accuracy with an arsenal of innovative features that fundamentally improve the inspection experience. This incredibly versatile optical 3D scanning system uses Smart Data Capture technology to acquire data at extremely high speed without compromising data quality while also allowing for variation of resolution within the bounds of the hardware as required by the application at hand.

Equipped with an advanced digital projector that utilises ground-breaking projection patterning and full-colour back projection, the StereoScan neo is one of the most advanced structured light scanners ever produced. With data acquisition powered by twin 16.8-MP digital cameras and fields of view ranging from 75 to 1000 millimetres that can be quickly and easily changed by the user as necessary, the StereoScan neo is the peak of structured light scanning performance on the market.

Key advantages

- Short scanning times through fast and powerful digital projection

- Smart Phase Projection for scanning of glossy and dark surfaces without pre-treatment

- Smart Data Capture technology allows for fast acquisition and different resolutions

- Colour back-projection of measurement results

- Quick and easy exchange of fields of view

- Maximum degree of feature accuracy through high-resolution camera sensors

- High-stability scanning

- Ready for automated robotic inspection thanks to rigid design and double carbon frame

- Accessories such as turntable and turn-tilt units allow for semi-automated scanning

- Handheld probe option

- Combinable with photogrammetry systems

Smart Phase Projection

Hexagon's Smart Phase Projection technology employs a cutting-edge type of fringe projection pattern designed to yield the highest quality data even when facing the most challenging measurement surfaces. This technology represents a pioneering departure from classical fringe projection techniques that means the StereoScan neo truly excels when faced with glossy and dark surfaces with no need for pre-treatment.

Variable Light Projection

The StereoScan neo's innovative Variable Light Projection (VLP) technology is an adaptive full-colour projection technique that allows the scanner to go further than just projecting the patterns necessary for the scanning process. With VLP, the generated measurement results can be instantly projected back onto the measurement surface, allowing for the easy colour-coded visualisation of deviations from CAD right on the part being measured.

SmartScan

Powerful and compact 3D scanning

Discover high-speed data acquisition at extremely high levels of detail with the non-contact 3D optical scanning technology of the SmartScan. Objects are digitised within seconds, irrespective of their size and complexity, and are directly available as high-precision 3D data in numerous standard formats for further processing.

With a compact design and low weight it is a fully mobile system, ready to go to work in the most challenging workshop conditions. Thanks to a high-tech carbon-fibre structural design, the SmartScan maintains extremely stable and reliable performance even under the pressure of temperature fluctuations.

Available in a variety of system configurations, and fully upgradeable thanks to its modular architecture, the SmartScan is the ideal choice for effective and affordable measurement performance across a range of applications and industries.

Smart Data Capture

The Smart Data Capture technology developed for all Hexagon structured light scanners powers data acquisition at extremely high speeds while maintaining high data quality. It also allows for the varying of measurement resolution as required by the demands of the specific application.

DPA photogrammetry

By working in combination with a high-end photogrammetry system, the SmartScan can be used to digitise considerably larger parts down to the smallest details with high accuracy maintained throughout a larger measuring volume.

Key advantages

- Ideal introduction to high-end 3D metrology
- Smart Data Capture technology allows for fast acquisition and different resolutions
- Fast and easy change of fields of view
- Upgradeable modular system configuration
- Scanning of glossy and dark surfaces without pre-treatment
- Mechanical and thermal stability
- Compact and low-weight design
- Handheld probe option
- Combinable with photogrammetry systems
- Accessories such as turntable and turn-tilt units allow for semi-automated scanning

PrimeScan

Scanning made simple

An attractive entry-level solution for the precise 3D digitisation of industrial components, the PrimeScan stands on a foundation of innovative fringe projection technology that allows it to deliver high luminous power and excellent projection quality.

Thanks to a compactly designed unit with a base area the size of an A4 sheet of paper and a total system weight of less than four kilograms, the PrimeScan is ready to go anywhere that high-resolution measurement is needed. Combined with a short working distance, its small form factor makes the PrimeScan perfect for scanning in special application areas, such as on a desktop or in difficult to access parts of the shop floor.

The scanning of glossy and dark surfaces without pre-treatment is aided by the PrimeScan's powerful projector, while the initial positioning of the measurement object is simplified by the scanner's integrated laser pointers. Selected robots and accessories enable both automated scanning and easy data acquisition within both smaller and larger volumes.
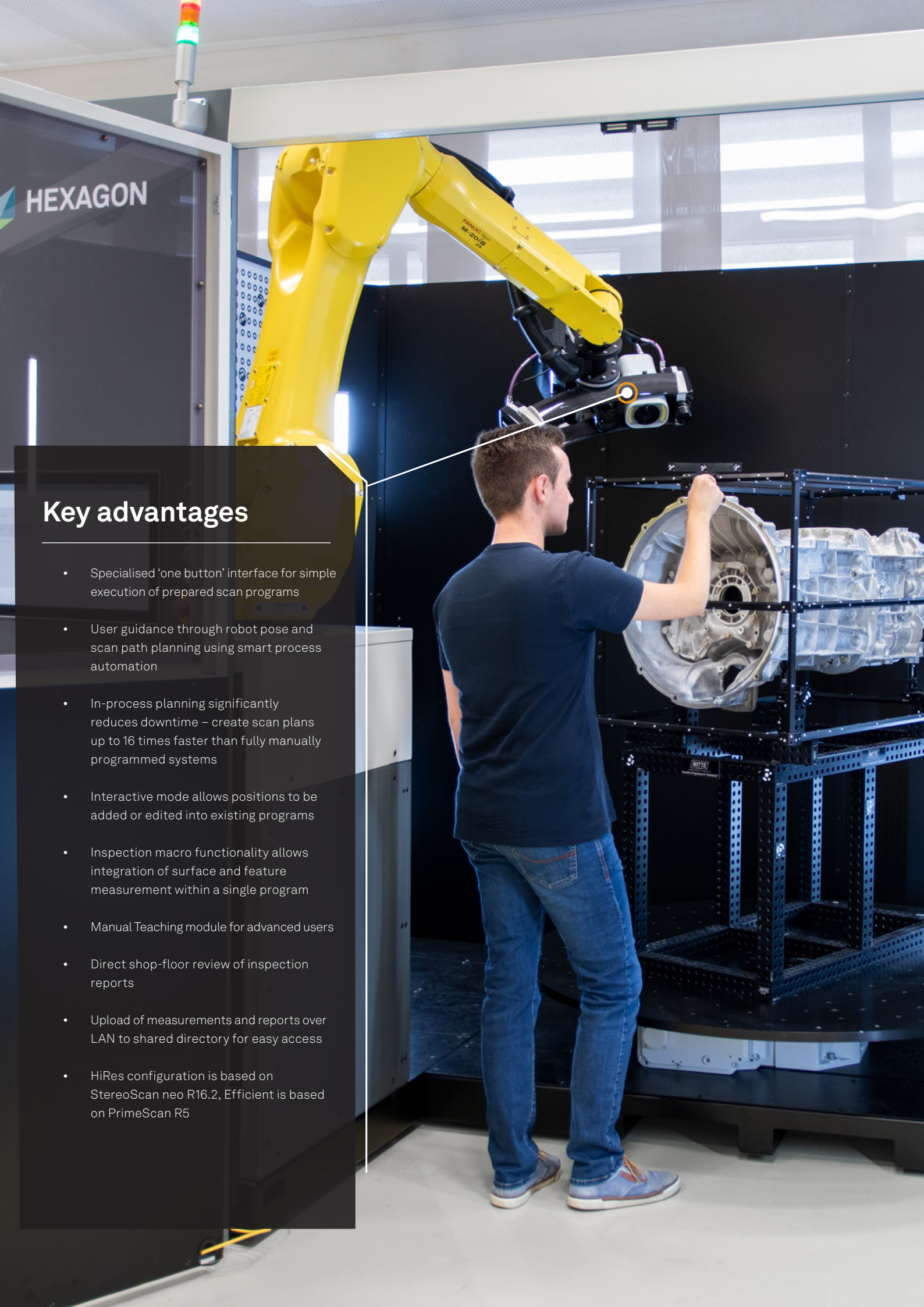
Smart Data Capture

The Smart Data Capture technology developed for all Hexagon structured light scanners powers data acquisition at extremely high speeds while maintaining high data quality. It also allows for the varying of measurement resolution as required by the demands of the specific application.

Configuration options

Depending on the required resolution and precision, different camera resolutions and fields of view are available for the PrimeScan. Five fixed configurations are available, allowing users to select the perfect tool for their particular measurement task.

PartInspect

Advanced automation made simple

Pairing a premium structured light scanner with a powerful robot arm for automated inspection offline, near-line or at-line, PartInspect offers straight-forward measurement cells that simplify and accelerate repetitive inspection tasks. A unique combination of automated scan planning and manual fine tuning delivers unmatched flexibility to the user, supported by an easy-to-use kiosk interface that allows for simple cell control right on the shop floor.

With PartInspect, project planning and execution requires no expert knowledge of robot teaching, allowing for simple automation that can be operated with minimal training. This all adds up to a range of high-end automated measurement systems that move vital inspection processes into the world of smart manufacturing with the minimum of expertise and effort.

OfflineProgramming

The PartInspect OfflineProgramming software tool allows for a wide range of measurement preparation functionality within an easy-to-learn user interface. The system takes the complexities of robot teaching out of the hands of the shop-floor user while also assisting advanced users through an intelligent guidance process.

ScanControl

On the shop floor, measurement is controlled through a touchscreen kiosk interface powered by the PartInspect ScanControl software. This allows the user to select and launch predefined measurement programs and means the standard user need never interact with the robot teach panel.

For advanced users, the Manual Teaching module within ScanControl allows for direct alterations to predefined measurement plans, making it easy to fine tune programs to ensure accurate and complete measurement at the first pass.

Key advantages

- Specialised 'one button' interface for simple execution of prepared scan programs

- User guidance through robot pose and scan path planning using smart process automation

- In-process planning significantly reduces downtime – create scan plans up to 16 times faster than fully manually programmed systems

- Interactive mode allows positions to be added or edited into existing programs

- Inspection macro functionality allows integration of surface and feature measurement within a single program

- Manual Teaching module for advanced users

- Direct shop-floor review of inspection reports

- Upload of measurements and reports over LAN to shared directory for easy access

- HiRes configuration is based on StereoScan neo R16.2, Efficient is based on PrimeScan R5

PartInspect configurations

Advanced automation made simple

PartInspect is available in two turnkey cell configurations, with each built on a different model from Hexagon's range of structured light scanners. Each cell is equipped with a touchscreen kiosk interface and a range of climate control sensors as standard.

PartInspect L HiRes

The flagship PartInspect turnkey cell is the PartInspect L HiRes, powered by the high-resolution sensor and digital projection technology of the StereoScan neo R16.2. The system has three field-of-view options, which can be selected as needed by the user, allowing for measurement of small-to-large parts with a single system. With X,Y resolution to within just 55 microns and scan accuracy to within 10 microns, the HiRes system is the pinnacle of automated structured light scanning solutions.

PartInspect L Efficient

PartInspect L Efficient is equipped with the economically priced sensor technology of the PrimeScan and comes with all necessary software features for automated 3D measurement of object surfaces at a high accuracy level of to within just 20 microns. The system is available with a choice of two field-of-view options for measuring small or large parts.

PartInspect custom

The Manual Teaching module within the PartInspect ScanControl software allows advanced users with specific automation needs to configure a custom PartInspect setup. By working with an experienced integrator, users can define an automated structured light inspection system tailored to their exact requirements.
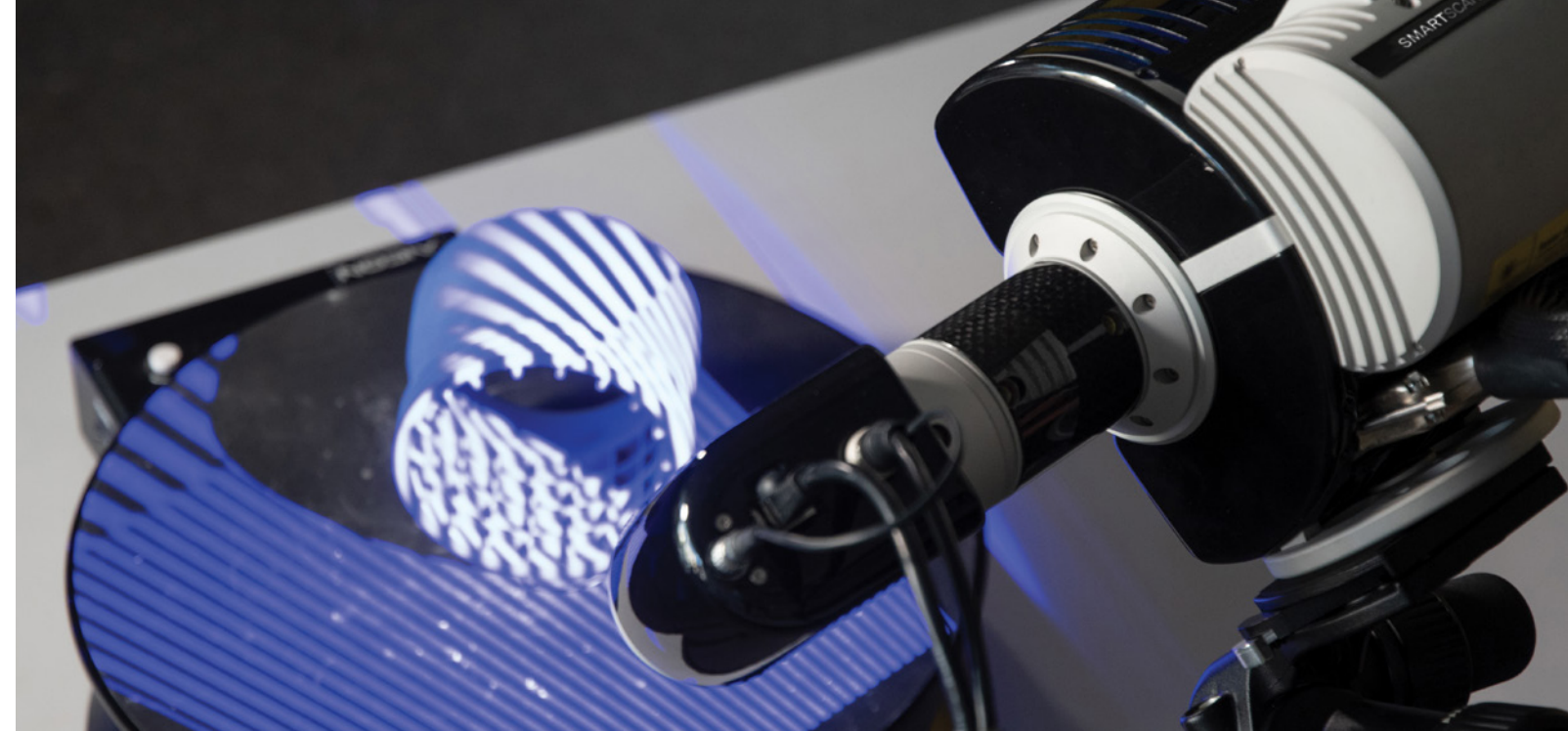
Simple automation

## Turntables and turn-tilt units for complete measurement productivity

An alternative to complex robot-based automation solutions can be achieved through the combination of structured light scanning technology with turntable or turn-tilt units. These productivity enhancing accessories allow a scanner to access every side of the measurement object without repositioning – all relevant areas of the object can be captured while minimising the number of single exposures.

- Semi-automated, highly precise inspection and digitisation of small-to-medium sized components

- Highly repeatable accuracy enables a usefully reproducible process

- Cost-effective and flexible alternative to a robot automation system

- Portable system with minimal training requirements

- Significant reduction in maintenance costs compared to full automation systems

OptoCat software

A dedicated scanning software solution
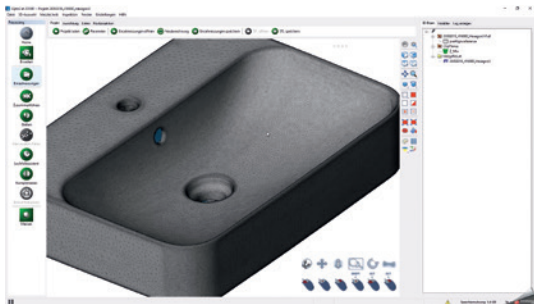
From 3D scanner calibration and data capture through to post-processing and evaluating measurement data, OptoCat is all the software needed for three-dimensional surface measurement. Featuring a diverse range of metrology functions, the innovative OptoCat modular software package allows users to develop a personally configured setup best suited to the needs of their specific measurement task.

Within the software, individual scans are automatically aligned and merged, with or without photogrammetric targets. The program uses intelligent algorithms to evaluate the geometric features of the scanned object, so there is no longer any need to align the individual scans to each other manually.

Built-in OptoCat functions make it easier to post-process captured 3D data, including functions such as flattening, compressing and optimising meshes, texturing, and data export. In addition to performing its own inspection, the program has the option to link directly to a variety of leading third-party metrology software platforms for an optimised, interactive and/or automatic evaluation. Measurement results can be compared directly or to imported CAD data. The software offers various functions for data analysis, edge extraction and other post-processing steps. Scan data can also be exported into a variety of formats for further processing.

OptoCat modules

Standard modules	
Calibration	Calibration of the scanner using a certified reference
Contour Matching	Alignment of the individual scans via object geometry
Target Matching	Alignment of the individual scans via target, with or without photogrammetry
Semi-Automatic Scanning	With a turntable or a turn-tilt unit
Data Processing	Hole filling, compressing, filtering
Basic Inspection Functionalities	Basic functions for data analysis and data comparison. Various alignment strategies: automatic and manual pre-alignment; shape alignment using Best-Fit; Best-Fit via reference points; 3-2-1; plane-line-point

Add-on modules	
Ext. Ref. Matching (DPA add-on)	Photogrammetry for precise recognition of targets and for alignment with predefined reference point clouds
MI.Probing	For tactile measurements with the MI.Probe mini, supplied with MI.Probe accessories
CAD Data Import	Importing of various CAD formats: STEP, IGES, Catia V4, V5, V6
Back Projection	Colour back projection of test results and information onto the measurement object with StereoScan neo
Texture Mapping	Capturing and transfer of the texture (colour and pattern) of an object to its scanned 3D data

Other functions

- Data import: STL, PLY, CTR, IGES | IGS, STEP | STP, PRT, MODEL, VDA, OBJ, ASCII | ASC, SDF
- Data export: STL, PLY, CTR, OBJ, ASCII | ASC, SDF
- Inspection functions, scalable false colour depiction for data comparison, fitting and comparison with various basic shapes (e.g. plane, cylinder, sphere)
- Construction: multi-cuts, distances, angles
- Various user levels available
- Interface with PC-DMIS, Inspire, REcreate, PolyWorks® and Geomagic Control X for automatic inspection
- Interface with VISI Reverse and Geomagic Design X for reverse engineering

SLS plug-ins

Deep third-party integration
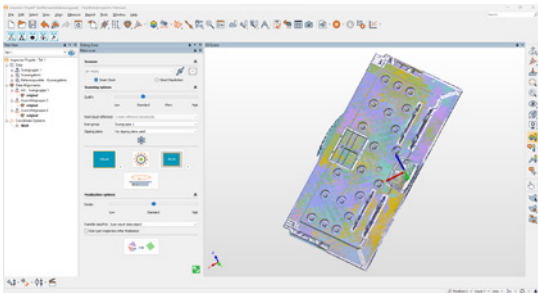
Our structured light scanner software development kit (SDK) was developed to allow for the deep integration of key functionalities of Hexagon's range of structured light scanners within the leading third-party metrology software platforms on the market.

The first implementation of this SDK is the SLS-PW Plug-in, an add-on for PolyWorks developed in cooperation with publisher Innovmetric. Equivalent plug-ins have subsequently been developed for Geomagic Control X and Geomagic Design X.

These plug-ins let users streamline their scanning and inspection workflow into a single software environment, with clear productivity benefits. The increased efficiency of a single platform workflow will reduce inspection times by eliminating the need to export and import measurement data between separate programs, as well as by minimising training needs.

Nexus

Centralised manufacturing within an open and integrated digital reality platform

Nexus is Hexagon's new digital reality platform for manufacturers. It connects people, technologies and data to accelerate innovation and bring ideas to life faster than ever before.

Break silos and put data to work

By connecting data across functions, Nexus enables collaboration and breaks down barriers between different engineering disciplines.

Build on Hexagon's manufacturing expertise

Nexus simplifies access to world-leading manufacturing expertise from Hexagon and its partner ecosystem.
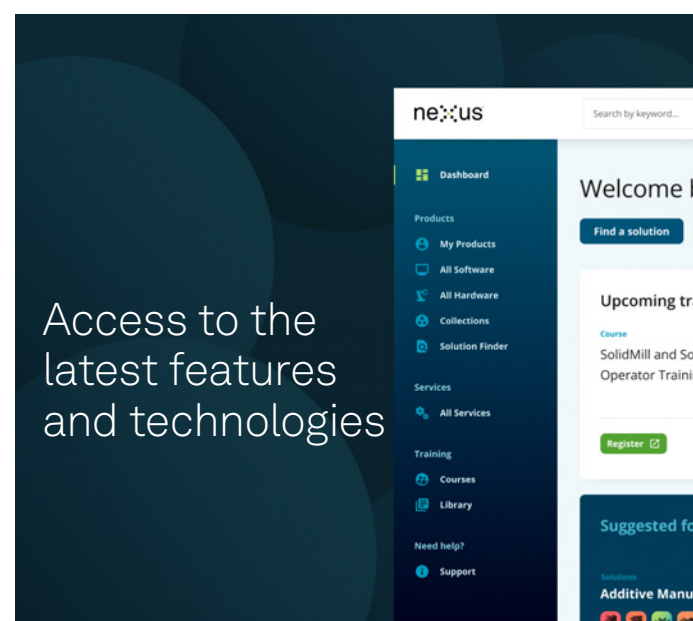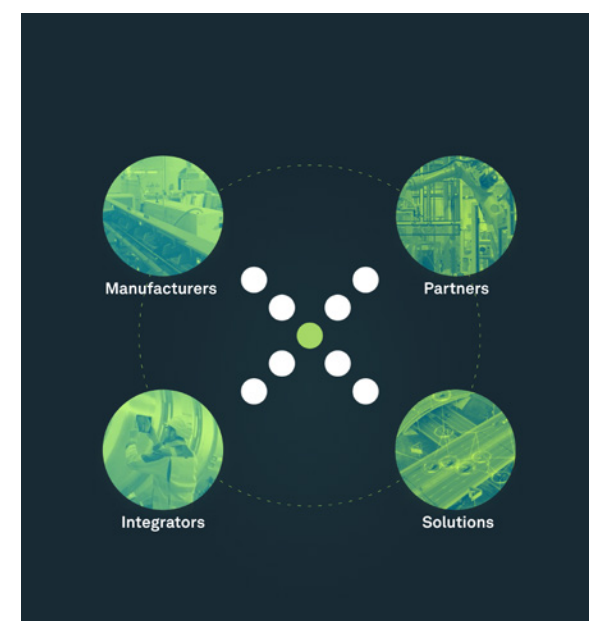
Experience the freedom of an open platform

Reimagine operations with an open platform that meets users where they are – starting with the technology they already own and integrating innovation at their own pace.

| Learn more at **nexus.hexagon.com**

Nexus delivers

- Speed: faster time to market through fluid collaboration and automated data sharing

- Efficiency: time and cost savings due to increased visibility and faster decision making across disciplines

- Productivity: unlock further improvements in productivity through faster feedback loops across the entire product lifecycle

- Optimal data sharing: only share the data needed to solve a particular problem

Access to the latest features and technologies

Photogrammetry meets structured light

Combining leading structured light scanning and photogrammetry technology is an unrivalled way to achieve high-accuracy 3D digitisation results on large measurement objects.

The measurement volume captured in a single scan by a Hexagon structured light scanner ranges from a few millimetres to about one metre across. By combining this technology with a photogrammetry system from the DPA Series, considerably larger freeform areas can also be captured at the highest level of detail. This add-on technology combination provides more reliable and much more precise global coordinates in the measurement object's coordinate system, allowing for accurate measurement across a greater volume.

- Targets are used to signalise reference points on the object
- A digital camera takes photos from a variety of directions and angles
- From this data, a point cloud that can be used as a reference system is created
- Single surface scans are made by a structured light scanner
- The scan data is then matched into the reference system

Automated photogrammetry integration

Part of the DPA Series of photogrammetry technology, DPA Online is an add-on photogrammetry module for PartInspect L cells. A high-resolution camera is mounted on or beneath the scanner and used to generate a reference frame to control global alignment precision on large and/or complex parts.

- Strengthens measurement geometry and ensures a standardised level of accuracy
- Guarantees accuracy to within 50 microns throughout the entire cell measurement volume
- Aimed at difficult to measure parts, such as flat, thin or very large objects
- Photogrammetry is fully integrated into the workflow of PartInspect measurement projects
- Includes robot programs customised for photogrammetry for each PartInspect L configuration
- Available for all PartInspect L configurations at time of initial installation or as a later upgrade
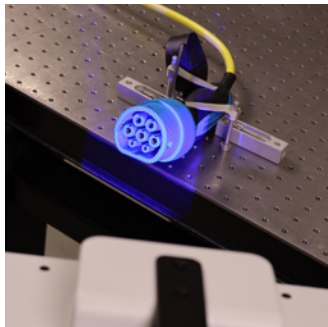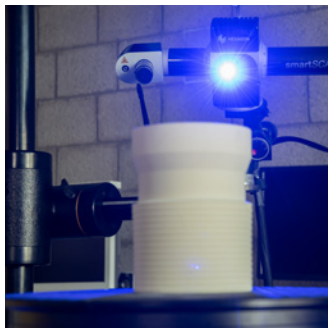
Applications

Hexagon structured light systems are suited for a wide range of applications
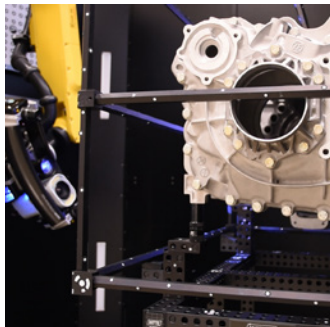
Quality control

Reverse engineering

Roundness inspection

Deformation analysis

Sheet-metal inspection

CAD comparison
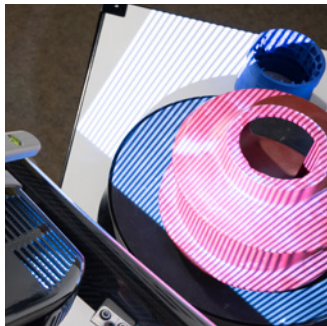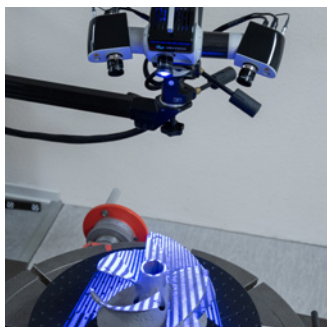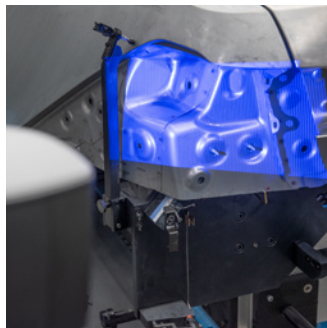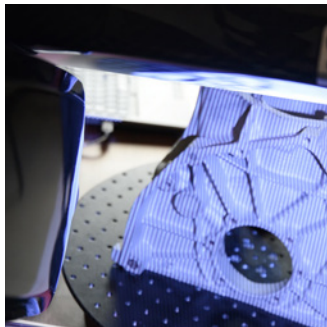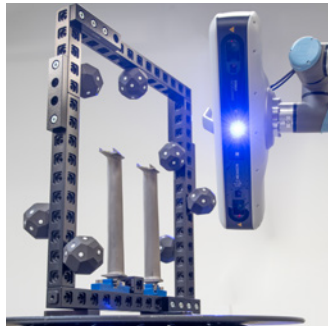
Accessories

Making the most of structured light systems

Tripod heads

Accessory transportation case

Turntable
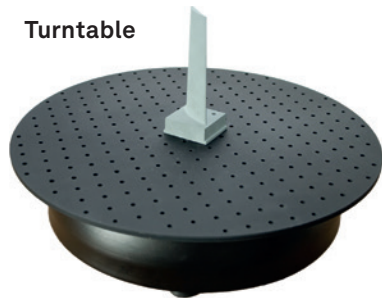
Turn-tilt

Stand

MI. Probe mini set

Driven by a truly end-to-end approach to innovation, Hexagon is wide range of accessories for Structured Light products reaches from added functionality to improved productivity while covering every need in between.

Hexagon's Manufacturing Intelligence online shop offers a streamlined search, order and delivery service for a wide range of accessories and spare parts in many countries worldwide.

Whether you are buying single items or in bulk, shop.hexagonmi.com takes the time and stress out of securing the measuring equipment you need.

Please direct any questions about Hexagon products or accessories to an authorised local sales representative to receive guidance and assistance in making an appropriate purchasing decision.

Visit our shop

Service and support

World-class products to rely on

Drawing on decades of research and development experience, structured light technology from Hexagon's Manufacturing Intelligence division is built on a long history of outperforming technological innovation. Deriving quality from experience to drive productivity is what keeps Hexagon in front and able to deliver first-class solutions for industries around the world.

Along with the assurance of five years of serviceability, owners of Hexagon structured light technology systems benefit from a minimum 12-month factory warranty as standard – our guarantee that our technology will always meet the needs of our users.

World-class support delivered locally

The international presence of Hexagon guarantees comprehensive aftersales support and services across the globe. With the largest dedicated service team of any metrology equipment manufacturer and an emphasis on locally delivered solutions, Hexagon is unmatched from service, repair, certification and calibration through operator training and software maintenance and upgrades.

World-class service made simple

Hexagon offers a wide range of support services extending well beyond the point of purchase. Delivered by experienced and skilled engineers at ISO-certified laboratories, local Hexagon Precision Centres or even on-site to minimise downtime, our after-sales portfolio is the most complete on the market.

- Maintenance and warranty plans that ensure equipment availability
- Trouble-free usage and minimal downtime
- Preferred hotline access at no additional cost
- Access to professional advice whenever needed

● Customer and demo centre   ○ Production facility

Customer Care Packages

Owners of the Hexagon structured light scanning products featured in this brochure also have the opportunity to invest in a Customer Care Package designed to ensure equipment remains in top condition and can be relied on for accurate measurement results throughout a lifetime of use.

Customer Care Packages include a selection of the following benefits, depending on the tier chosen.

	Platinum	Gold	Silver	Bronze
Planned annual service	✓	✓	✓	✓
Customer hardware support	✓	✓	✓	
Software support and software updates	✓	✓	✓	
Annual maintenance and recertification	✓	✓		
Remote connected assistance	✓	✓		
Repair parts and labour	✓			
Customised local benefits	✓	✓	✓	✓

For complete details of the benefits of each level of Customer Care Package, please contact a local Hexagon representative.

Accuracy

Defining accuracy

Having a reliable basis for the stated accuracy of our structured light scanning systems is vital. That's why we measure every scanner against our defined Scanner Acceptance Test. Based on VDI/VDE Guideline 2634 Part 3, this Scanner Acceptance Test uses four clear quality parameters to ensure users have full confidence in the accuracy of their Hexagon structured light scanner.

Sphere spacing error [SD]
Global quality parameter. Deviation from distance of fitted spheres to calibrated distance.

Length measuring error [E]
Global quality parameter. The deviation of the nearest points along the centre axis.

Probing error form [PF]
Local quality parameter. Deviation from the surface to a fitted sphere.

Probing error size [PS]
Local quality parameter. Deviation from the fitted sphere radius to the calibrated radius.

Technical specifications

Scanner configurations

	SmartScan VR800	StereoScan neo R16.2	SmartScan R12	PrimeScan R5
Camera sensor	4x Monochrome, CMOS 1''	Monochrome, CMOS, 4/3"	Monochrome CMOS, 1.1"	Monochrome, CMOS 2/3"
Camera resolution	4x 20 MP 5544 x 3694	2x 16.8 MP 5472 x 3084	2x 12.4 MP 4112 x 3008	2x 5.0 MP 2448 x 2048
Projection unit	Digital projector		Miniaturised projection technique	
Light source	50 W high-power LED (blue)	3 x 100 W high-power LEDs (red + green + blue)	100 W high-power LED (blue)	
Operating temperature	0 – 40 °C ambient (without condensation)	0 to 50 °C ambient (without condensation)		
Sensor weight	9.8 kg	12 kg*	4 kg*	3.8 kg
Power supply	External, AC 110/230 V, 50-60 Hz, 270 W	Internal, AC 110/230 V, 50-60 Hz, 600 W	External, AC 110/230 V, 50-60 Hz, 150 W	
Control unit	Integrated	Integrated	External	Integrated
Operating system	Windows 10, 64 Bit			
Probing	-	Compatible with MI.Probe mini		

*Weight may vary depending on the measuring fields.

Measurement specifications

StereoScan neo R16.2

Outer camera position	Triangulation angle: 30° Base length: 450 mm Working distance: 840 mm			
Field of view [1]	L – 350 mm	L – 500 mm	L – 850 mm	L – 1000 mm
Field of view size [2]	295 x 165 mm	445 x 255 mm	730 x 440 mm	890 x 545 mm
Measuring depth [3]	175 mm	250 mm	420 mm	500 mm
X, Y resolution [4]	55 µm	83 µm	143 µm	180 µm
Sphere spacing error	10 µm	16 µm	30 µm	32 µm
Length measuring error	20 µm	28 µm	60 µm	64 µm
Probing error size	6 µm	12 µm	16 µm	18 µm
Probing error form	7 µm	12 µm	16 µm	18 µm

Inner camera position	Triangulation angle: 30° Base length: 150 mm Working distance: 350 mm		
Field of view [1]	S – 75 mm	S – 125 mm	S – 200 mm
Field of view size [2]	70 x 40 mm	105 x 60 mm	170 x 110 mm
Measuring depth [3]	36 mm	54 mm	100 mm
X, Y resolution [4]	12 µm	19µm	33 µm
Sphere spacing error	5 µm	7 µm	8 µm
Length measuring error	10 µm	15 µm	18 µm
Probing error size	6 µm	7 µm	6 µm
Probing error form	5 µm	6 µm	7 µm

All StereoScan neo and SmartScan fields of view (FOV) can be realised by using the same fundamental components, i.e. the system base, cameras and projection unit, through a simple change of the objectives (and of the CRP base, if necessary). In order to simplify the setup and calibration of the standard measuring ranges, they will only be provided with an individually prepared and tested set of lenses for each FOV. The lenses are delivered with a predefined factory setting for the aperture and focal depth, which are optimised for the corresponding FOV and do not need to be altered by the user.

Measurement specifications

SmartScan VR800

Scanner configuration

Accuracy		
Configuration	Large base	Small base
Measurement volume [1] [2]	800	320
Sphere spacing error	28 µm	9 µm
Length measuring error	48 µm	18 µm
Probing error size	8 µm	3 µm
Probing error form	10 µm	6 µm

[1] Values apply to all measurement volumes related to a base.
[2] Naming of measurement volume represents the measurement diagonal of the measurement area.

Measurement specifications

Smart Zoom Change resolution and keep output constant at 5 MP					
Configuration	Large base			Small base		
Measurement volume [2]	800	660	430	320	250	160
Measurement area [3]	666 x 443 mm	544 x 372 mm	357 x 238 mm	269 x 169 mm	214 x 140 mm	137 x 89 mm
Measurement depth [4]	400 mm			160 mm		
X, Y resolution [5]	238 µm	179 µm	119 µm	98 µm	74 µm	49 µm
Software symbol	238 µm	179 µm	119 µm	98 µm	74 µm	49 µm

[3] Lateral expansion (X x Y) in the centre of the measurement volume.
[4] Depth of the measurement volume (Z).
[5] The values for the lateral resolution have been calculated based on the ratio of the measurement area and the number of pixels of the camera chip.

Smart Resolution Change resolution (20, 12, 5 MP) and keep measurement volume constant					
Configuration	Large base			Small base		
Measurement volume [1] [2]	800			320		
Effective sensor resolution	5 MP	12 MP	20 MP	5 MP	12 MP	20 MP
Measurement area [3]	666 x 433 mm			269 x 169 mm		
Measurement depth [4]	400 mm			160 mm		
X, Y resolution [5]	238 µm	179 µm	119 µm	98 µm	74 µm	49 µm
Software symbol	238 µm	179 µm	119 µm	98 µm	74 µm	49 µm

Measurement specifications

SmartScan R12

Triangulation angle: 27° Base length: 470 mm Working distance: 1000 mm				
Field of view [1]	M – 350 mm	M – 450 mm	M – 750 mm	M – 1000 mm
Field of view size [2]	285 x 205 mm	380 x 275 mm	590 x 435 mm	825 x 630 mm
Measuring depth [3]	180 mm	240 mm	370 mm	500 mm
X, Y resolution [4]	69 µm	92 µm	143 µm	201 µm
Sphere spacing error	16 µm	20 µm	30 µm	44 µm
Length measuring error	36 µm	40 µm	60 µm	88 µm
Probing error size	9 µm	10 µm	15 µm	22 µm
Probing error form	9 µm	10 µm	15 µm	22 µm

Triangulation angle: 29° Base length: 260 mm Working distance: 500 mm				
Field of view [1]	SL – 90 mm	SL – 200 mm	SL – 300 mm	SL – 500 mm
Field of view size [2]	70 x 55 mm	145 x 105 mm	240 x 160 mm	420 x 325 mm
Measuring depth [3]	44 mm	90 mm	144 mm	250 mm
X, Y resolution [4]	17 µm	35 µm	57 µm	102 µm
Sphere spacing error	6 µm	9 µm	12 µm	21 µm
Length measuring error	15 µm	18 µm	24 µm	42 µm
Probing error size	6 µm	6 µm	8 µm	15 µm
Probing error form	6 µm	6 µm	8 µm	15 µm

[1] Designation of the scanner bases (S, SL, M, L,) and the diagonal in the centre of the measuring volume.
[2] Lateral expansion (X x Y) in the centre of the measuring volume.
[3] Depth of the measuring volume (Z).
[4] The values for the lateral resolution have been calculated theoretically (ratio of the size of the FOV and number of pixels of the camera chip).

PrimeScan R5

Short working distance Triangulation angle: 26° Working distance: 370 mm					Long working distance Triangulation angle: 18° Working distance: 540 mm
Field of view	50 mm	125 mm	200 mm	400 mm	700 mm
Field of view size [1]	40 x 30 mm	100 x 80 mm	150 x 125 mm	300 x 275 mm	500 x 450 mm
Measuring depth [2]	24 mm	64 mm	100 mm	200 mm	350 mm
X, Y resolution [3]	16 µm	40 µm	63 µm	125 µm	208 µm
Sphere spacing error	4 µm	7 µm	12 µm	20 µm	56 µm
Length measuring error	10 µm	16 µm	24 µm	40 µm	112 µm
Probing error size	6 µm	6 µm	6 µm	10 µm	28 µm
Probing error form	4 µm	6 µm	7 µm	10 µm	28 µm

All PrimeScan fields of view (FOV) are an integral part of the system: their configuration cannot be changed. Each field of view is delivered as a separate device.

[1] Lateral expansion (X x Y) in the centre of the measuring volume.
[2] Depth of the measuring volume (Z).
[3] The values for the lateral resolution have been calculated theoretically (ratio of the size of the FOV and number of pixels of the camera chip).

PartInspect L specifications

PartInspect L cell specifications

Maximum part height	1500 mm
Maximum part diameter	1500 mm
Maximum part load on turntable	2000 kg
Industrial robot Max. payload Reach	25 kg 1853 mm
Voltage range (different regions)	400 Y/230 V AC (+/-5%), 16 A 50/60 Hz or US/C 480 Y/277 V AC, 120 V AC 60 Hz
Input power	5 kVA
Average power consumption	1.5 kW
Housing dimensions	W 3050 x D 2480 x H 2500 mm
Maximum door opening width	1670 mm
Cell weight	2500 kg
Required ceiling height	3500 mm
Required floor load capacity	400 kg/m²

PartInspect L configuration specifications

	PartInspect L HiRes StereoScan neo R16.2	PartInspect L Efficient PrimeScan R5
Field of view	FOV L-350/500/850	FOV 400/700
Camera sensor	Monochrome, CMOS 4/3"	Monochrome, CMOS 2/3"
Camera resolution	16.8 MP 5472 x 3084	5 MP 2448 x 2048
Projection unit	Digital projector	Miniaturised projection technique
Light source	3 x 100 W high-power LEDs (red + green + blue)	100 W high-power LED (blue)
Minimum measuring time	1 s	
Sensor weight	12 kg [1]	3.8 kg
Power supply	Internal, AC 110/230 V, 50-60 Hz, 600 W	External, AC 110/230 V, 50-60 Hz, 50 W
Control unit	Integrated, USB 3.0	
Operating system	Windows 10, 64 Bit	

DPA Online accuracy

Length measurement accuracy	MPE [2] 20 µm + 20 µm/m (diagonal length of measurement volume)

[1] Weight may vary depending on the measuring fields.
[2] Maximum Permissible Error of length measurement accuracy, based on VDI/VDE 2634 part 1: defined as maximum permissible deviation of a measured length, which is located between two measuring points, signalised with photogrammetric targets, in the entire measuring volume of PartInspect L, regardless of position and orientation.

HEXAGON

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