HEXAGON

Hexagon x GelSight

From Guesswork to Groundwork:
Quality Assurance Reinvented

Precision that connects every single dot.

Have you ever run your fingers over a surface and thought, “Something feels off, but I’m not sure what it is”? Or have you wondered how to comprehensively inspect the internal structure of a component while also fully capturing its surface quality? Traditionally, quality inspection has often focused on verifying dimensions or internal analysis using technologies like Computed Tomography (CT), with detailed surface inspection receiving less attention. This leads to siloed solutions in quality assurance. Achieving a holistic quality assessment with consistency and repeatability remains a challenge that can cause time-consuming and costly downstream consequences.

Veteran expertise plays a key role in “connecting the dots,” but even seasoned experts can disagree, leading to a lack of confidence in the results. It’s high time to get rid of this uncertainty and gain confidence in your results. We bring you a **unified hardware and software system** that combines high-resolution surface inspection, precise dimensional measurement and material inspection. It maps all results directly onto your part’s 3D model. This allows you to pinpoint defects with certainty and instantly align surface anomalies with the part’s geometry. This enhances analysis, leading to better decision-making and more comprehensive quality control. For a truly holistic evaluation, you can also **seamlessly integrate CT data to further optimize your non-destructive testing processes**.

Five reasons to make a change:

The first complete surface-to-shape measurement solution – now also complementing CT analysis. GelSight’s Digital Touch technology brings human-like sensing to quality control. When combined with Hexagon’s Absolute Arm 7-Axis and Absolute Scanner AS1 3D laser scanner, an even more powerful system emerges: the first unified portable system for surface and dimensional inspection. Enhanced by the ability to seamlessly link precise surface data with the internal data from your Computed Tomography scans, you gain an **unparalleled view of the overall quality of your components**. Eliminate silos in a collaborative way. Build a smarter, more comprehensive quality system from the ground up – driven by tactile intelligence and interoperable data.

From Guesswork to Groundwork: Quality Reinvented.

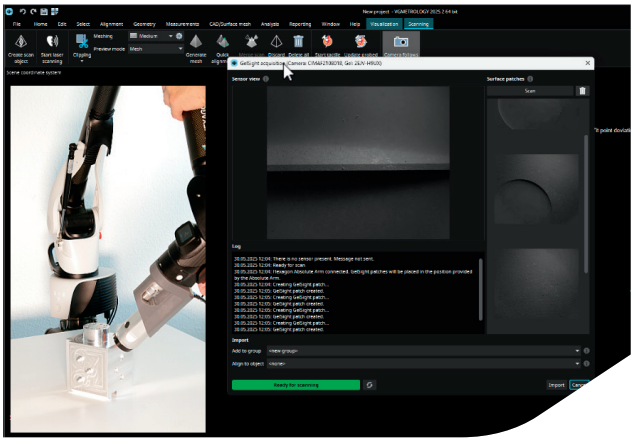
1. **Go from 4 hours to 4 minutes:** Easy workflow ensures results for every skill level.

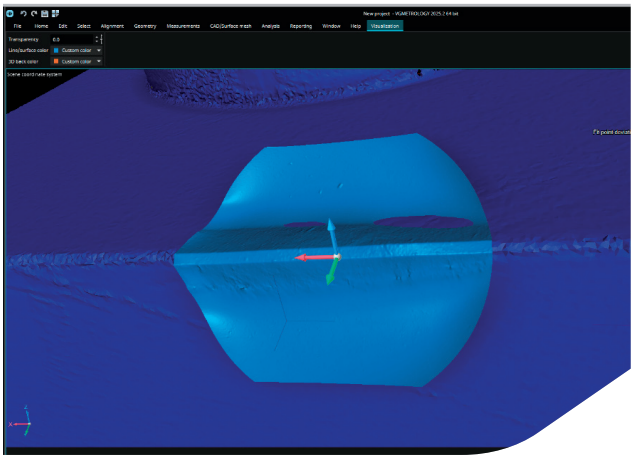
2. **Get precision AND speed:** With microscope-grade measurements.

3. **100% Alignment:** One team, one system, one process, one standard – **seamless integration of surface, shape, and internal CT data**.

4. **Absolute CAD accuracy:** Surface details in context with shape data – now also perfectly aligned with your existing CT models.

5. **Deploy ANYWHERE:** With a portable system.





Precision meets flexibility

A dual turnkey offering for new and existing portable arm users

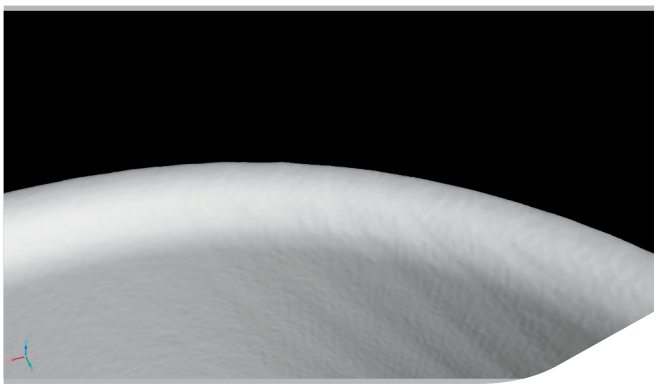
Industrial Solution Offerings

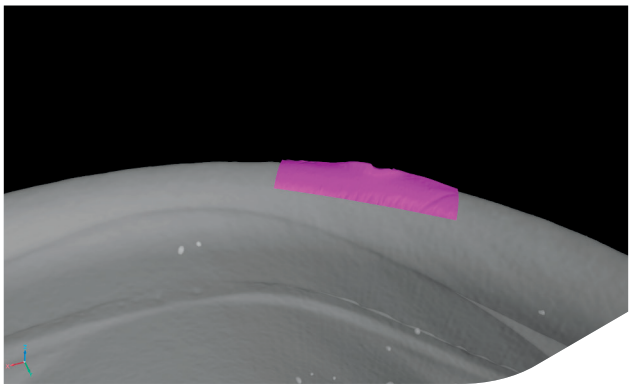
Starter: Everything you need to get started with combined surface and geometry inspection.

Upgrade: Upgrade your existing arm system for combined surface and geometry inspection.

CT Extension: Extend your existing CT solution (e.g., with VGSTUDIO MAX) with precise surface inspection for a comprehensive component evaluation.

Gain absolute CAD accuracy by overlaying surface and CT data for precise defect localization. Seamlessly integrate internal CT insights with external surface details for a holistic quality assessment.



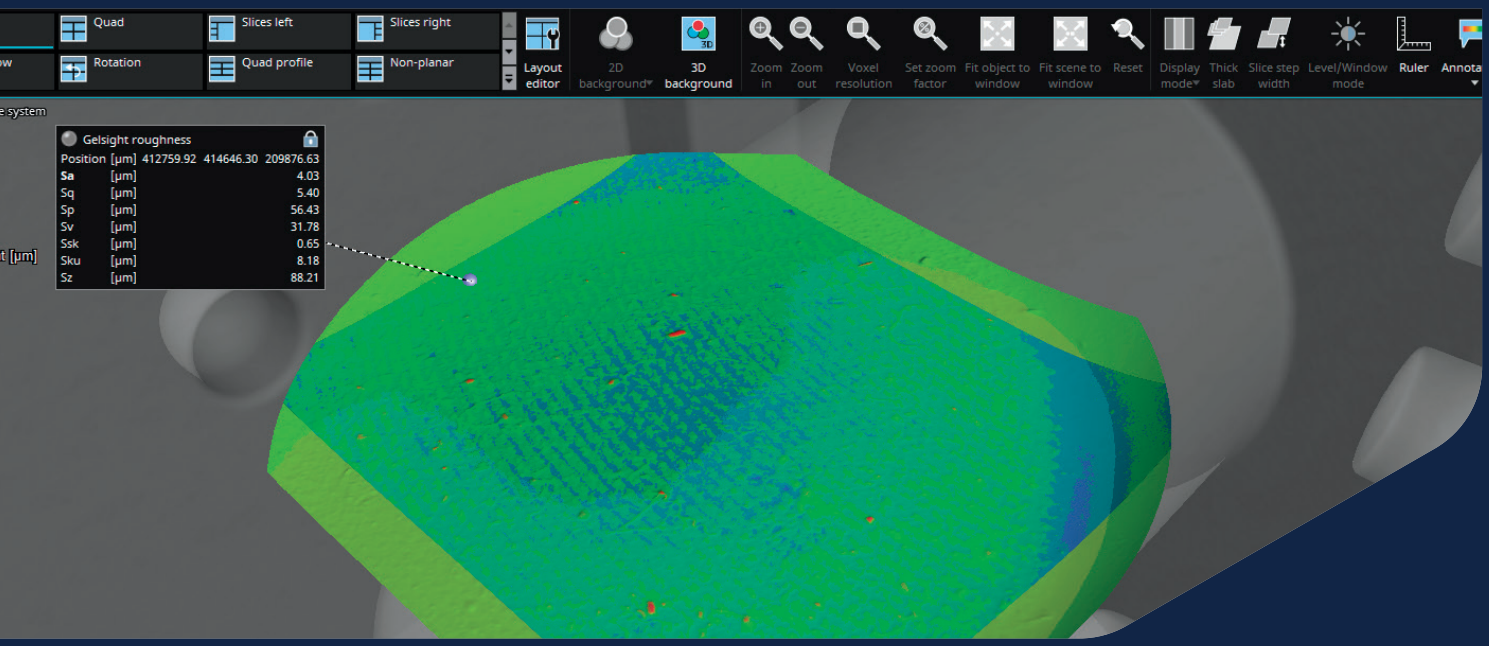


	Absolute Arm [1]	AS 1 [2]	Hardware & Software licence [3]	GelSight [4]	GelSight Adapter [5]	SpareGels [6]
Starter	•	•	•	•	•	•
Upgrade	•	•	•	•		
CT Extention			(GelSight module)	•		•

[1] Absolute Arm 7-Axis [2] Absolute Scanner AS1 [3] VGMETROLOGY ES + GelSight Module + GelSight Mobile PRO [4] Series 2 [5] For mounting GelSight Series 2 to Absolute Scanner AS1 [6] 10 pieces A dual turnkey offering for new and existing portable arm users – and an ideal complement for industrial Computed Tomography users.

Field of Application

Rapid data acquisition and processing dramatically reduce inspection time, transforming what used to be hours into mere minutes. This approach enables a detailed 3D reconstruction of the inspected surface and shape, which – **in combination with internal CT data** – provides a acomprehensive view of the object's condition in a single dataset.



Challenges and our solutions

Inconsistent Inspection Results Standardized digital process ensures repeatability and eliminates human bias.

Separate Inspection Teams One integrated system streamlines processes and reduces inefficiencies.

Difficulty Correlating Defects to 3D Model Surface, dimensional, **and internal CT data** are overlaid for precise defect localization.

Lack of Data for Process Improvement Digital measurement provides objective, quantifiable data for process optimization.

Limited Portability and Flexibility Portable tools enable on-site inspection, reducing downtime.

Speed or Precision? Microscope-grade accuracy with rapid, precise measurement – no compromise needed.

Surface irregularities not detailed in CT inspection CT technology is excellent for internal inspection but can reach its limits with fine surface irregularities such as scratches, dents, machining marks, or rough surfaces, as variations are averaged out during surface reconstruction from CT data. GelSight complements this with sub-micron accurate surface analysis of defects, profile, and roughness, which can be seamlessly linked with your CT data.

Utilize GelSight for specific surface analyses such as:

Detection and measurement of s**cratches and dents** on aerostructures, nacelles, panels, cowlings, stringers, transparencies (cockpit and passenger windows), and landing gears. Examples include dents on compressor blades or turboshaft casings.

Analysis of **fastener flushness** and **hole details** like countersinks and chamfers (Automatic Hole Chamfer Analysis).

Evaluation of **surface roughness** (e.g., on turbine blade extrados or 3D-printed parts) and **shot peening coverage** on turbine disks.

Identification of **machining marks and mismatch** (e.g., on engine fuel lines) and analysis of **weld beads** (Automatic Weld Bead Analysis).

Early corrosion and pit detection (number and depth of pits within seconds) – a benefit used by engine manufacturers for MRO operations. This includes corrosion on aluminum casings or fuel injector caps.

Measurement of **radii**, for example, on turbine blade leading edges.

High Training Effort Ease-of-everything digital tools simplify inspection, reducing your training burden while ensuring results you can trust.

A real-world scenario

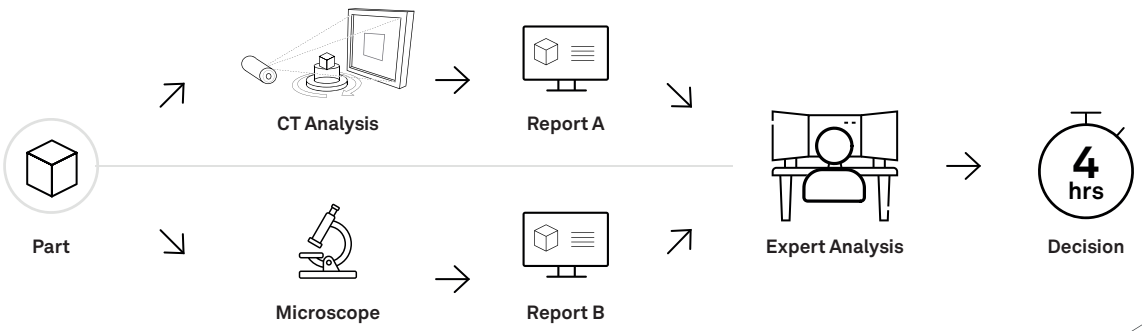
Imagine a typical large Aerospace MRO (Maintenance, Repair and Overhaul) facility:

- Numerous aerospace products being evaluated for repair
- 200+ pieces of equipment
- Specialty lab for defect evaluation
- No real shop floor capability to evaluate defects (believe it or not, fingernails are sometimes used)

Enabling decision making in minutes

A CT analysis report

A report and a microscopic surface data report are created separately.
An expert invests time to understand the separate results, assess the interdependencies, and make a decision.



The CT-GelSight process

GelSight produces surface data, which is combined with CT analysis in VGSTUDIO MAX.
Users make decisions in minutes.

Learn more about Hexagon x GelSight. Contact us today!

hexagon.com/manufacturing-intelligence/

HEXAGON

Hexagon is the global leader in measurement technologies. We provide the confidence that vital industries rely on to build, navigate, and innovate. From microns to Mars, our solutions ensure productivity, quality, and sustainability in everything from manufacturing and construction to mining and autonomous systems.

Hexagon (Nasdaq Stockholm: HEXA B) has approximately 24,800 employees in 50 countries and net sales of approximately 5.4bn EUR.

Learn more at hexagon.com.

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