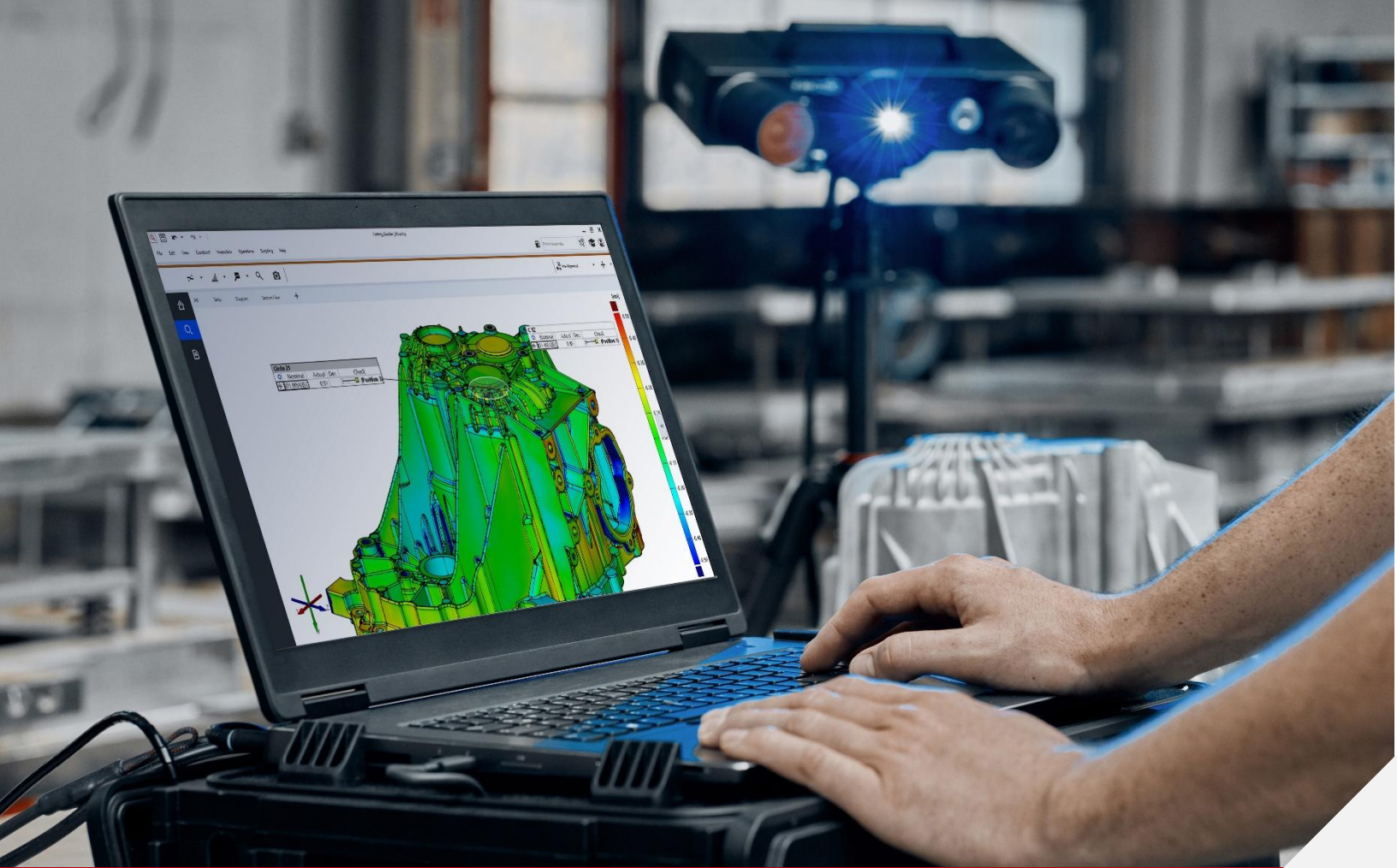




3D Optical Inspection Guide

Inspection Suite

**3D Scanning
Reverse Engineering
SuPAR AR Inspection Tool**

trillion

Save Labor, Costs and Schedule.
Measure, Compare, and Verify – in 3D

Precision Inspection



A Connected Ecosystem for a Smarter Factory Floor

Trilion's Inspection Suite combines 3D scanning, augmented reality, and digital-twin technology into one connected ecosystem. Each tool bridges the virtual and physical worlds, delivering faster inspections, higher precision, and full traceability from design to production.

Our Inspection Tools

3D Scanning Systems

From portable to automated, Trilion's ZEISS-certified scanners, including ARAMIS 1, ATOS Q, T-SCAN Hawk, and ScanBox, capture detailed 3D geometry and full-field strain data. Perfect for reverse engineering, alignment, and digital QA across any industry.

SuPAR AR Inspection

Overlay CAD models directly onto physical parts to visualize accuracy in real time. SuPAR's augmented-reality interface guides operators through inspections 4× faster than traditional methods, improving communication, reducing rework, and moving quality upstream.

RVAT – Real-Time Virtual Assembly Tooling

RVAT merges optical metrology and AR guidance to enable tool-less assembly with sub-millimeter precision. Every step is verified and stored within the Xi Digital Twin (XiDT), streamlining manufacturing and QA into one digital process.

TRITOP Photogrammetry

For large-scale or complex parts, TriTop delivers fast, portable 3D coordinate measurement, tying big structures and tooling into the same precise, CAD-based workflow.

The Complete Picture

Together, these tools create a continuous digital thread from design to inspection, ensuring every measurement tells the same story of precision, traceability, and confidence.

Scanning Automation & Reverse Engineering

From Physical to Digital, Faster Than Ever

At Trilion, we turn complex geometry into clear, usable data. Our automated scanning and reverse-engineering tools capture the physical world with precision, then feed it directly into your digital workflow.

3D Scanning Automation

The GOM Scan 1 and ZEISS ScanPort make automation accessible. Compact and intelligent, they bring repeatable, high-resolution scanning to any workstation, eliminating manual errors and accelerating inspection cycles. Every part, every angle, perfectly aligned with CAD.



Reverse-engineering & Inspection Ecosystem.

The ATOS Q 3D scanner delivers metrology-grade surface detail, capturing millions of data points that reveal every curve, edge, and feature. From there, Geomagic Design X transforms those scans into editable, parametric CAD models, bridging the gap between the physical and digital worlds for redesign, tooling, or reproduction of legacy parts. And with ZEISS INSPECT software, those same scans can be compared directly to CAD to validate geometry, thickness, and dimensional accuracy, closing the loop between scanning, modeling, and verification.

3D Scanning

Trilion's automated scanning workflow doesn't just document quality, it creates the foundation for faster design, smarter iteration, and better parts from the start.

Portable & Automated Shop-Floor Scanning

Precision That Moves with You

Inspection shouldn't be confined to a lab. With Trilion's portable and automated solutions, metrology meets you where you work.

The **T-SCAN hawk 2** brings ZEISS-level accuracy directly to the shop floor or field. Lightweight and precise, it captures fine surface detail across large or complex geometries, perfect for scanning assemblies, welded structures, or tooling directly where they're built. Whether you're inspecting a component in a fixture or validating fit during assembly, the T-SCAN hawk 2 makes high-end measurement truly mobile.



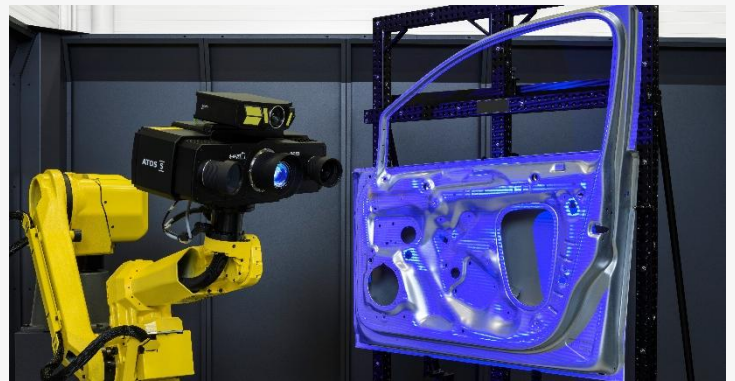
3D Scanning For All

Together, the T-SCAN hawk 2 & ScanBox bring unmatched flexibility and throughput, allowing manufacturers to capture, inspect, & validate everything from small parts to full vehicle bodies with confidence. Wherever precision is required, Trilion delivers it.



Large Scale Automation

When scale and automation matter most, the ZEISS ScanBox delivers. Designed for high-throughput inspection, it automates the 3D scanning of large components such as car doors, body panels, or entire chassis. Each scan is performed with repeatable accuracy and consistent lighting conditions, eliminating variability and speeding up production cycles. The ScanBox is the go-to solution for automotive and large-structure manufacturing, where quality, repeatability, and efficiency must work hand in hand.



SuPAR AR Inspection Tool

The Power of AR Visual Inspection

Augmented Reality (AR) Visual Inspection is a game-changing technology that transforms visual inspection during quality control.

Using AR, operators can overlay CAD data onto physical objects. This innovative approach allows for more efficient and effective visual inspection.

With AR Interactive Inspection, operators can easily identify and diagnose problems, drastically reducing inspection time and increasing productivity.

By bringing the virtual world into the real one and comparing 3D to 3D, AR opens up a new frontier in quality control and visual inspection.



Incredible Time Savings: SuPAR provides 3D to 3D comparison with CAD overlay on real parts, which is up to 80% faster than traditional 2D drawing processes.

Why Use:

Move Quality Upstream

Substantial savings, manufacturing efficiency, and better product quality are the powerful outcomes.

Faster Error Detection "4x Faster Than Visual Inspections"

SuPAR AR technology can identify issues in real time, allowing for immediate corrective actions. You can detect problems before they become costly and time-consuming to fix.

Flexible, Digital, and Mobile

SuPAR can be used in a wide variety of settings, from manufacturing plants to supplier sites. The flexibility makes it an ideal solution for companies that need to perform inspections in multiple locations.

Reporting & Communication "A Powerful Communication Tool"

SuPAR allows for complete documentation and reporting of your inspection, transforming communication within your team.

Real-Time Virtual Assembly Tooling (RVAT)

Building Smarter, Without the Tooling

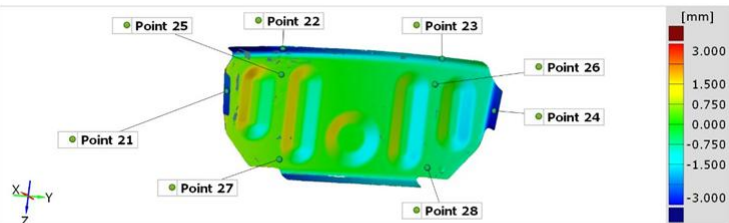
Where SuPAR brings visual inspection into augmented reality, RVAT goes further, transforming assembly itself into a fully digital process. Instead of comparing parts to CAD, RVAT uses optical metrology and real-time guidance to build directly from CAD, eliminating hard tooling altogether.

With RVAT, engineers see not just whether a part is correct, but exactly how to position, align, and assemble it. Using the same high-precision optical systems trusted in our testing solutions, RVAT tracks each component in six degrees of freedom and provides real-time feedback as operators bring digital designs to life.

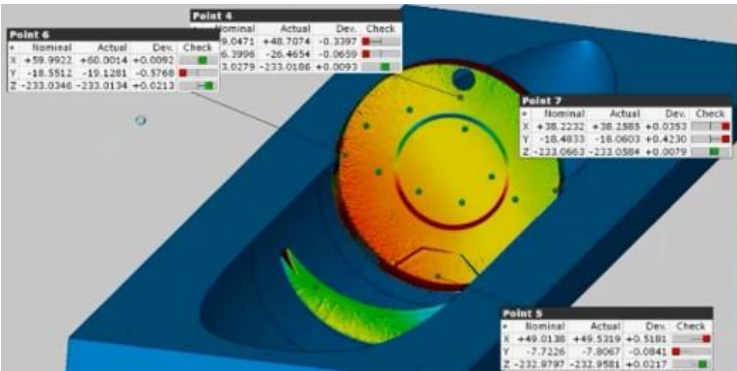
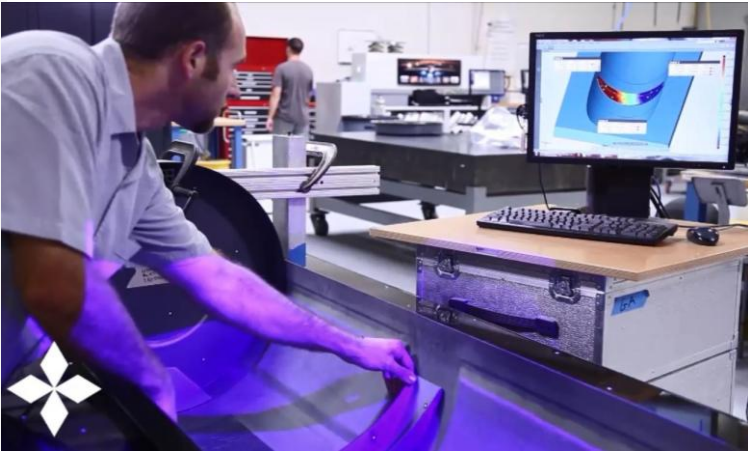
Xi Digital Twin (XiDT)

Every step, from alignment to bond placement, is verified and documented automatically inside the XiDT, creating a live, traceable record of how the product was built. This digital-thread integration means instant quality assurance, faster adjustments, and complete transparency from design through production.

NLG Close-Out

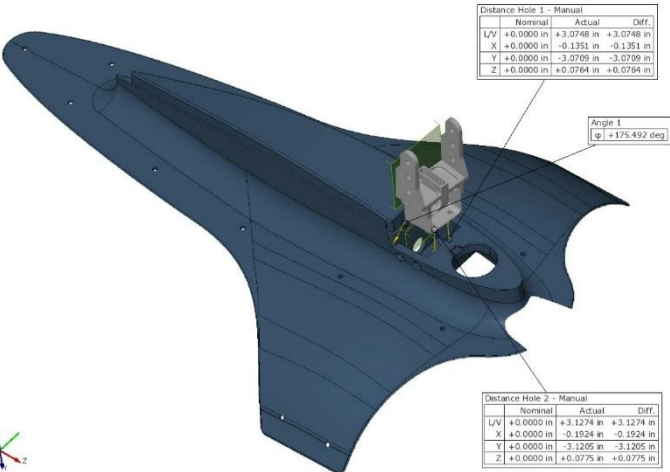


Element	Datum	Property	Nominal	Actual	Tol -	Tol +	Dev	Check	Out
Point 28		X	+1539.028	+1539.491	-0.800	+0.800	+0.463		
Point 27		X	+1538.981	+1538.596	-0.800	+0.800	-0.385		
Point 26		X	+1538.959	+1539.510	-0.800	+0.800	+0.550		
Point 25		X	+1538.975	+1538.645	-0.800	+0.800	-0.330		
Point 24		Y	+201.743	+204.571	-0.800	+0.800	+2.828		+2.028
Point 23		Z	-298.235	-297.330	-0.800	+0.800	+0.906		+0.106



Why Use:

RVAT replaces costly, rigid fixtures with flexibility and speed. It's assembly without compromise, faster, leaner, and always true to design.

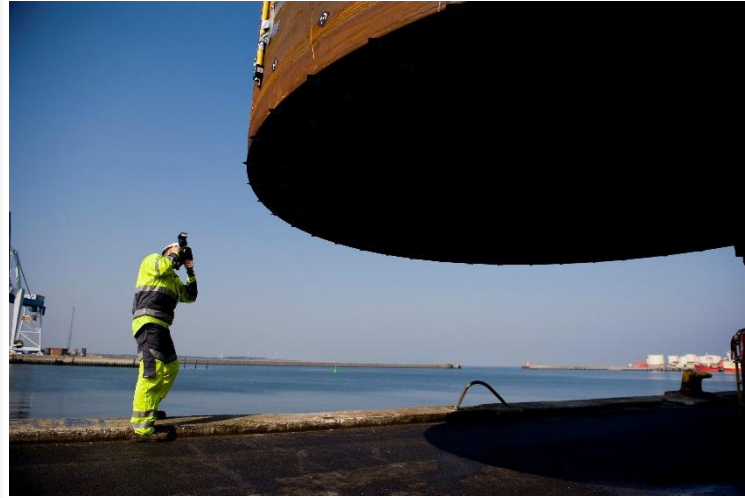


TRITOP CMM for Large-Scale Measurement

Measure Big. Move Fast. Stay Precise.

When your parts outgrow the reach of traditional scanners, TRITOP delivers portable, high-accuracy measurement anywhere you need it. As a portable optical coordinate measuring machine (CMM), TRITOP uses advanced photogrammetry to capture precise 3D coordinates simply by photographing the object from multiple angles.

Lightweight, quick to set up, and completely non-contact, TRITOP brings metrology to the part, whether it's a car body, aircraft structure, or large assembly fixture. The system instantly creates a full 3D coordinate network that defines hole positions, edge points, and reference geometry without ever touching the surface.



ZEISS INSPECT software

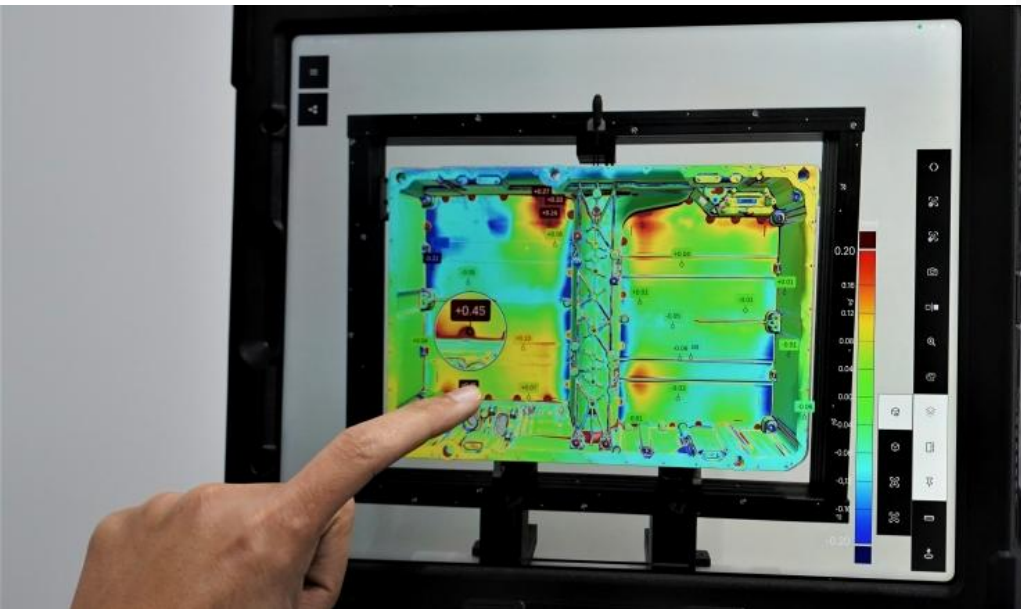
Integrated with ZEISS INSPECT software, TRITOP seamlessly connects to downstream inspection and analysis workflows, allowing users to compare data directly to CAD, monitor deformation, or align large assemblies within a digital twin environment.

With TRITOP, large-scale precision becomes mobile, giving engineers the freedom to measure anything, anywhere, with ZEISS-level confidence.

3D Metrology Toolbox

ARAMIS Optical Strain		ARAMIS Optical Strain is a full-field, non-contact measuring system based on 3D digital image correlation & dynamic photogrammetry.
TRITOP CAM Photogrammetry		TRITOP system portably measures 3D coordinates of complex objects precisely and provides large area automatic stitching for ARAMIS & ATOS
RVAT Digital Assembly		Digital Manufacturing with RVAT (Real-time Virtual Assembly Tooling) provides precision assembly guidance and complete data for manufacturing Digital-Twin.
ZEISS CT (3D X-Ray)		ZEISS (CT 3D-X-ray) is a state-of-the-art metrology CT scanner capable of the highest accuracy and resolution in the industry, for internal dimensioning, SPC, AM, QA, etc.
T-SCAN hawk 2 Laser Scanner		The T-SCAN hawk 2 is a next-generation, handheld 3D laser scanner that delivers exceptional accuracy in a lightweight, portable design.
ATOS 3D Scanners		ATOS and the portable T-Scan Hawk are non-contact 3D scanners were developed for repeatable and precise measurements of 3D shape prior to testing.
ZEISS ScanBox Large Automation		The ZEISS ScanBox automates 3D scanning for large parts, delivering fast, repeatable inspection for automotive and large-scale manufacturing.

Benefits & ROI



Turn Every Measurement into Measurable Value

The Trilion Inspection Suite doesn't just improve quality, it transforms how you measure success. By connecting SuPAR, 3D Scanning, RVAT, and TRITOP within a single digital workflow, every process becomes faster, more accurate, and more intelligent.

Faster Cycles. Lower Costs. Higher Throughput.

Automating inspections and assembly with optical metrology eliminates bottlenecks and reduces rework. RVAT builds directly from CAD, TRITOP measures large structures without setup delays, and SuPAR shortens inspections by up to 80%. Together, these efficiencies deliver substantial savings in labor and production time.

Faster Cycles. Lower Costs. Higher Throughput.

Real-time digital verification ensures parts are right the first time. Every step, from scanning to assembly, is documented in the XiDT, providing you with traceable data for QA, compliance, and certification.

Complex models precisely matching reality improves products and reliability.

Smarter Decisions, Proven ROI.

By integrating measurement, inspection, and reporting into one ecosystem, manufacturers see productivity increase by as much as **10×** while scrap and rework drop toward zero. The result: faster launches, stronger margins, and a measurable return on every investment in precision.

Trilion Engineering Services

Trilion Engineering Services is the perfect solution for solving complicated applications and/or developing methods for critical measurements, providing precision data. We provide experienced engineers, with industry specific experience in aerospace, automotive, microelectronics, civil, power, biomechanics and consumer products.

Services include:

- Dynamic component testing in-situ or in the field
- Optical strain reality for FEA initial conditions and response
- High-speed measurements and vibration analysis
- Large-scale structural testing
- 3D Scanning

We look forward to supporting our customers and applying our technologies to solve , providing precision data their problems. We get professional results every time.



All-in-One Solution

For over 25 years, Trilion Quality Systems has been an industry leader in Optical Metrology Systems, developing and supporting unique applications throughout North America. Optical metrology brings long-awaited advanced Factory 4.0 capabilities to the manufacturing industry.

Trilion Engineering Services is the perfect solution for companies with complicated applications and data requirements. Our experienced level 3 engineers and optical measurement systems get professional results every time.

A manufacturing revolution, reducing costs and improving quality!

Offering inspection tools that industry leaders can rely on.



trillion

651 Park Avenue
King of Prussia, PA
19406

(215) 710-3000

trillion.com
info@trillion.com

For more information, visit:
trillion.com



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