



5 Reasons Every Engineer Should Be Using Industrial CT

Engineering is about precision, but traditional inspection methods often fall short. Cutting parts open, surface scanning, or relying on manual measurements can miss critical defects and slow development. Industrial Computed Tomography (CT) changes that. By providing non-destructive, high-resolution imaging, it gives engineers complete visibility into internal structures, helping them catch hidden flaws, speed up iterations, and ensure product reliability. As manufacturing demands reach new heights, industrial CT is becoming an essential tool for companies looking to stay ahead.

1. Catch Defects Early

Many critical defects—porosity, cracks, voids, inclusions, fiber misalignment—go undetected by traditional inspection techniques. Surface-level scans and destructive testing only provide partial

visibility, leaving manufacturers at risk of undetected failures. Industrial CT sees inside materials and assemblies in full 3D, revealing microscopic flaws that weaken structural integrity, affect performance, or shorten product lifespan. It's an essential tool for catching hidden defects before they become costly failures, whether in a die-cast engine component, a composite aircraft panel, or a lithium-ion battery. By identifying these issues early, engineers can prevent warranty claims, recalls, and unexpected breakdowns in the field.

2. Accelerate Product Development

Flawed designs can slip through traditional validation methods, leading to performance issues and costly redesigns. Industrial CT allows engineers to inspect internal geometries, measure hidden features, and compare physical parts against CAD models without cutting them open. By detecting material inconsistencies, improper fits, or structural weaknesses early, teams can refine prototypes with confidence. This eliminates guesswork, shortens iteration cycles, and ensures that the final design is optimized before production. Whether verifying fluid

channels in a medical device or stress points in a composite structure, CT scanning provides a clear, data-driven path to a production-ready design.

3. Verify Supplier Parts

Even when a supplier follows drawings and specifications, subtle variations in material composition, internal structures, or assembly tolerances can lead to failures. Industrial CT gives manufacturers a non-destructive way to verify that supplier components meet exact requirements. It reveals voids in castings, fiber misalignment in composites, and improper weld penetration—defects that could cause mechanical failures or reduce lifespan. By incorporating CT scans into first-article inspections, engineers can detect manufacturing inconsistencies before they affect production. This strengthens quality control, prevents costly rework, and holds suppliers accountable for delivering parts that truly meet spec.

4. Improve Yield and Reduce Scrap

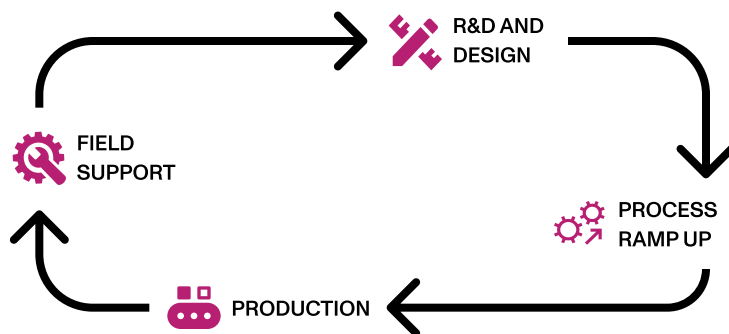
Perfect parts on day one don't guarantee quality six months later. Manufacturing processes naturally drift over time due to tool wear, material batch variations, or environmental factors. Industrial CT allows manufacturers to monitor production trends and make real-time adjustments before small defects escalate into large-scale quality issues. It helps optimize injection molding, casting, and additive manufacturing by identifying porosity, shrinkage, and warpage that could signal process instability. By integrating CT scanning into routine process validation, companies can tighten tolerances, reduce waste, and ensure every part meets specifications—not just the first few off the line.

5. Build Customer Trust

Even well-designed, thoroughly tested products sometimes fail in the field. Traditional failure analysis often requires destructive disassembly, risking lost data or inconclusive results. Industrial CT allows

engineers to investigate root causes non-destructively, scanning returned parts to detect cracks, fatigue, and hidden defects without compromising evidence. It's particularly valuable for industries with strict safety requirements—like aerospace, automotive, and medical devices—where understanding failure mechanisms is critical. By diagnosing failures faster and more accurately, companies can improve future designs, refine manufacturing processes, and prevent repeat issues, ultimately building more reliable, longer-lasting products.

Where Does Industrial CT Fit Into Product Development?



Industrial CT is a powerful tool throughout the entire product lifecycle, from early-stage R&D to in-field troubleshooting. By providing engineers with non-destructive, high-resolution insights at every phase, CT scanning helps accelerate development, optimize manufacturing, and ensure long-term reliability.

R&D and Design

The earliest stages of product development rely on iteration—prototyping, testing, and refining designs to achieve optimal performance. Traditional validation methods, like destructive testing or external lab analysis, introduce delays and added costs. Industrial CT enables rapid, non-destructive analysis of prototypes, allowing engineers to inspect



internal geometries, verify material integrity, and compare physical parts to CAD models with precision. This speeds up iteration cycles, reduces the risk of unseen defects, and ensures that designs are production-ready before expensive tooling is finalized.

Process Ramp-Up

Scaling from prototype to production is where manufacturing variability can emerge, and catching issues early is critical. Industrial CT provides real-time insight into first-article parts and process stability, allowing engineers to refine tooling, adjust process parameters, and ensure suppliers are meeting quality standards before full-scale production begins. Whether analyzing porosity in castings, validating injection-molded parts, or assessing assembly accuracy, CT scanning helps manufacturers de-risk ramp-up by providing clear, actionable data on product consistency.

Production

In high-volume manufacturing, maintaining quality and reducing waste are essential to profitability. Industrial CT integrates seamlessly into quality control workflows, providing automated, high-throughput inspection to detect defects before they reach customers. By enabling real-time analysis of dimensional accuracy, material consistency, and

structural integrity, CT scanning helps manufacturers minimize scrap, optimize yield, and ensure every part meets specifications. For industries with stringent quality requirements, such as aerospace, medical devices, and automotive, industrial CT is a crucial tool for maintaining compliance and product reliability at scale.

Field Support

Even the best-engineered products can face unexpected failures in the field. When performance issues arise, industrial CT allows manufacturers to diagnose root causes without destructive disassembly. By scanning returned components or failed assemblies, engineers can identify hidden defects, wear patterns, and manufacturing deviations that might have led to failure. This data helps teams improve future designs, refine production processes, and support warranty investigations with clear, visual evidence. By leveraging CT scanning for failure analysis, companies can strengthen product reliability, reduce downtime, and build stronger relationships with customers.

Industrial CT isn't just a quality control tool—it's an end-to-end solution for engineers who need deeper insights, faster iterations, and better decision-making across the entire product lifecycle.



Neptune: X-Ray Vision for Labs

Neptune is designed for engineers who need fast, high-resolution insights into complex parts. It delivers powerful industrial CT scanning in an accessible, easy-to-use system, enabling rapid analysis without the need for specialized expertise. Whether troubleshooting prototypes or verifying production parts, Neptune provides unmatched clarity into internal structures, helping teams make better decisions faster. For companies like L'Oréal, Neptune has been a game-changer—allowing them to identify manufacturing defects in seconds and avoid costly, time-consuming trial-and-error processes.

“In our first scan...we saw [the leak path]. We saved ourselves four months of building a unit tool and then finding out that it was not good enough.”

— Zach Mahoney

Director of Packaging Quality, L'Oréal

Triton: Automated CT for Factories

Triton brings CT scanning to the factory floor, enabling real-time, high-throughput inspection at production scale. Designed for seamless integration into manufacturing workflows, it ensures that every part meets quality standards before reaching customers. Automated defect detection allows manufacturers to catch out-of-spec parts in as little as 0.1 seconds. Whether verifying weld integrity, inspecting composite materials, or assessing molded components, Triton ensures consistent quality at every stage of production. Its ability to provide immediate feedback makes it a critical tool for high-volume manufacturing.

“Neptune is a fantastic way to validate that a part meets requirements before we move into production, and Voyager gives our customers confidence in the products we ship. It is the future of manufacturing.”

— Ben Wynne

Co-Founder and CEO, Intrepid Automation



Voyager: Cloud-Based Analysis Software

Industrial CT is only as powerful as the software that makes sense of the data. Voyager transforms CT scans into actionable insights, giving engineers a browser-based platform to analyze, share, and collaborate on scan data from anywhere. With AI-powered automation, Voyager streamlines defect detection, dimensional analysis, and reporting, making CT scanning more efficient than ever. By eliminating the need for specialized desktop software, Voyager democratizes CT analysis, allowing teams across global organizations to access and interpret scan data in real time. For companies like Eaton, this has transformed how they manage product development and quality assurance across multiple business units.

“Voyager helps Eaton streamline product development and production across international business units through one collaborative software platform to share, review, and edit scans in real time.”

— Kirstyn Hein

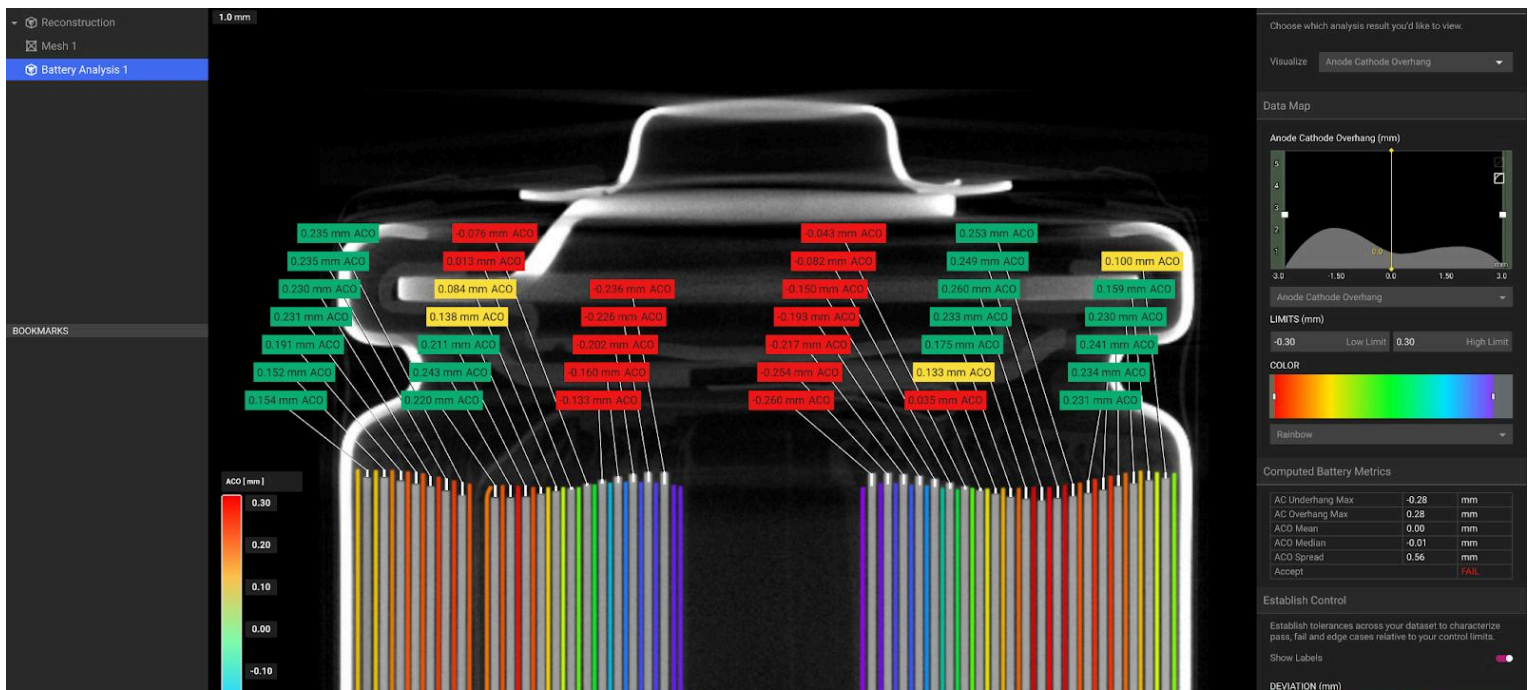
Mechanical Engineer, Eaton Group

Conclusion

Industrial CT is no longer an expensive, niche technology—it’s an essential tool for engineers who demand precision, efficiency, and confidence in their work. Whether used for design validation, supplier verification, manufacturing optimization, or quality assurance, CT scanning provides the clarity needed to make data-driven decisions.

With Neptune, Triton, and Voyager, Lumafield is making CT scanning more accessible, intelligent, and indispensable than ever.

Ready to see how industrial CT fits into your workflow? [Book a demo with Lumafield today.](#)



An Integrated Inspection Platform



Neptune

Industrial CT scanner

+ EVERYDAY ENGINEERING TOOL

With a easy-to-use touchscreen interface and AI-driven scan configuration, Neptune can work for your entire team—no dedicated technician required.

+ INSTANT INSIGHTS

Avoid time-consuming destructive testing and inspect anything from single parts to complex assemblies in a matter of minutes.

+ AT HOME IN YOUR WORKSPACE

Neptune is designed to be used as a frontline tool in an office or workshop environment. It's just 6 feet wide and runs on a standard 120V outlet.



Triton

Production-scale CT

+ AUTOMATE INSPECTION

Triton quickly loads, scans, and exchanges your part, while fully automating decision-making, to nearly eliminate human error.

+ ULTRA-FAST CT

Capture high-resolution scans of internal features in as little as 0.1 seconds.

+ EASY TO USE

Monitor quality on Triton's live dashboard and scale complexity up or down with a fully configurable and user-friendly UI, allowing for seamless switching between scan tasks.



Voyager

Analysis software

+ LEVERAGE THE WORLD'S ENGINEERING EXPERTISE

Visualize scans in Voyager, Lumafield's browser-based analysis software. Quickly pinpoint issues and share bookmarks and notes with collaborators. Voyager includes Atlas, our generative AI engine equipped with encyclopedic engineering knowledge to empower your teams.

+ MEASURE THE INVISIBLE

Take dimensions for hidden features and apply automated check gauges to ensure quality inside and out.

+ BETTER PRODUCT DECISIONS

Use Voyager on your production line to automate go/no-go decisions and catch small defects before they become big problems.

