



Building Confidence in Inspection

Exploring the people, practices, and evolving frameworks behind reliable NDT

In Association with

PRAGMA

Page 16

From Compliance to Digital Understanding: Why NDE 4.0 Must Become a Regulatory Standard



A Heartful Thank's to all the Contributors

This edition of NDT Trends has been enriched by the knowledge, experience, and perspectives shared by our contributors. Through your articles, interviews, and insights, you help OnestopNDT bring meaningful conversations to the global NDT community. Your support adds depth to every edition and strengthens our mission of promoting learning, innovation, and industry growth. We sincerely value your contribution and thank you for being part of this journey.

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About OnestopNDT

OnestopNDT is a global digital platform built exclusively for the Non-Destructive Testing industry. We connect professionals, companies, manufacturers, training institutes, and decision-makers through industry-focused content, visibility, knowledge sharing, and professional engagement.



ONE STOP NDT

June 2026 | Issue 111



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Dear Readers and the Global NDT Community,

As we present the June edition, I would like to sincerely thank everyone who continues to support and believe in the vision of OnestopNDT.

What started as an idea to bring the NDT community closer has now grown into a platform focused on connecting professionals, sharing knowledge, and creating opportunities across the industry. Over the last few years, the trust, support, and positive response we have received from contributors, industry professionals, and companies worldwide has been truly inspiring.

The NDT world is evolving rapidly with new technologies, automation, and digital transformation shaping the future. At OnestopNDT, our goal is to help the industry stay connected, informed, and ready for what's next. We remain committed to creating meaningful platforms and initiatives that add value to professionals, businesses, and the global NDT ecosystem.

We are grateful for the trust, support, and encouragement we continue to receive from the industry. Your support motivates us to keep growing, improving, and contributing towards a stronger and more connected NDT community.

Thank you for being part of this journey.

Santosh Gavankar
Founding CEO, OnestopNDT

SOME THINGS IN NDT CAN'T BE ~~Googled.~~

That's why we created **NDT Talks** — a monthly panel where real experts share insights you won't find online.



Editor's Note



The Inspection Rulebook

The NDT industry has always been built on trust. Trust in the inspections we perform, the people carrying them out, and the standards that help keep industries safe, reliable, and accountable.

But today, the conversations around standards, certifications, and compliance are beginning to evolve. They are no longer just about audits or procedures. They are becoming part of larger discussions around digitalization, traceability, AI, data ownership, and the future of industrial decision-making.

As industries move faster and become more connected, the need for stronger, more adaptable frameworks has never been more important. At the same time, innovation in NDE must continue to move hand in hand with confidence, responsibility, and safety.

This edition explores that changing landscape, not from the perspective of hype, but through the lens of an industry steadily adapting to a more digital and standards-driven future. Because while technologies may continue to evolve, one thing remains constant: strong industries are built on strong standards.

We hope this edition sparks fresh perspectives and meaningful conversations along the way.

Enjoy the read.

Ravindra Warang
Editor-in-Chief

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Lizard M8 for Top Side & Subsea Inspection

Advanced Electromagnetic Defect Detection & Corrosion Mapping system for structural & Material Integrity Assessments.



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*Top Stories Shaping
the NDT Industry*

NDT NEWS



NEWS I

Voliro Develops Drone-Based B-Scan System for Advanced Corrosion Mapping



Image Source - @Inспенet

Swiss aerial robotics company Voliro has introduced a new drone-based industrial inspection prototype designed to enhance corrosion detection and mapping through NDT. The company's Drone-Based B-Scan system combines aerial ultrasonic inspection with advanced data collection capabilities to generate continuous corrosion maps of industrial assets.

The new technology is integrated into the Voliro T platform, an omnidirectional inspection drone developed for contact-based inspections in hard-to-access environments. The system aims to address limitations associated with conventional spot-measurement techniques by enabling continuous scanning and significantly increasing inspection data density during a single operation.

According to Voliro, the Drone-Based

B-Scan system utilizes aerial ultrasonic testing to create continuous corrosion maps, allowing inspectors to identify defects that may remain undetected between traditional measurement points. The technology is capable of collecting tens of thousands of inspection points during an inspection, compared to approximately 100 measurements per hour using conventional methods.

The system generates complete B-scan records, thickness maps, and defect sizing data directly during flight, providing asset owners and inspection teams with a more comprehensive understanding of asset condition and corrosion progression.

The development builds upon the capabilities of the Voliro T drone, which is designed to perform contact inspections on complex industrial structures. The platform supports multiple NDT sensor technologies, including ultrasonic testing (UT),

Electromagnetic Acoustic Transducer (EMAT), Pulsed Eddy Current (PEC), and coating thickness measurement systems.

Its tilting-rotor architecture and six-degrees-of-freedom control system enable stable contact with curved, vertical, and inclined surfaces, supporting inspections without the need for scaffolding, rope access, or extended shutdowns.

Voliro indicated that the technology is intended for applications including corrosion under insulation (CUI) inspection, pipeline integrity assessment, elevated structure evaluations, and asset integrity monitoring across industries such as oil and gas, energy, mining, and chemical processing.

The company confirmed that the Drone-Based B-Scan solution remains in the prototype stage and is currently undergoing preparations for field validation. Voliro is seeking collaboration with Voliro T operators and industrial asset owners to support early testing and evaluation of the technology in operational environments.

"If you manage critical infrastructure and would like to be among the first to test it on your assets, contact us," the company stated in the official announcement.

The Drone-Based B-Scan initiative is being developed under Voliro Lab, the company's internal innovation program focused on advancing aerial inspection technologies for industrial applications. The project reflects the growing adoption of drone-enabled NDT solutions that combine automation, advanced sensing technologies, and high-density inspection data to support more effective asset integrity management.

NEWS II

GE Vernova Acquires Robotech to Support Advanced Automation Initiatives



Image Source - @Investing.com

GE Vernova has announced a definitive agreement to acquire Robotech Automation, a Canada-based robotics and automation specialist, as part of its efforts to accelerate industrial automation capabilities across its operations and supply chain infrastructure.

Based near Montreal, Quebec, Robotech Automation develops customised automation systems through in-house engineering, design, and integration services supported by manufacturing partners. The company employs approximately 35 people and has been collaborating with GE Vernova on automation projects within the company's manufacturing operations.

The acquisition is expected to strengthen robotics and automation initiatives within GE Vernova's Advanced Research Center (ARC), supporting deployment across

production environments to improve operational safety, quality, delivery performance, and manufacturing efficiency. The development reflects the increasing role of automation and advanced robotics in industrial operations, including applications associated with inspection, manufacturing quality, and infrastructure reliability.

"Robotech brings exactly the kind of specialized talent, proprietary systems, and hands-on integration expertise that will accelerate what we're building in robotics and automation at GE Vernova," said Scott Strazik. "GE Vernova is committed to advancing our capabilities in areas that are critical to how we operate and compete with excellence, and this acquisition is a focused, strategic step to add key talent, accelerate our organic programs, and establish a world-class robotics deployment capability within our Advanced Research Center."

GE Vernova and Robotech are currently working together on active projects within the company's U.S. manufacturing facilities, including operations in Schenectady, New York, and Charleroi, Pennsylvania.

"We are proud of the strong, talented team behind Robotech's success, they are what made this company what it is today. Joining GE Vernova, a long-time business partner whose values align closely with our own, marks an exciting new chapter and opportunity for our people," said Carl Thibault and Francis Bourbonnais. "GE Vernova's leadership truly understands the importance of innovation, automation, and robotics in staying competitive in the global market, and we are confident our team will thrive contributing to that vision. This opportunity will allow our employees to grow both technically and personally within a large, solid organization that offers meaningful advancement opportunities and highly innovative projects."

The transaction forms part of GE Vernova's broader capital allocation and strategic acquisition strategy. Financial details were not disclosed. The acquisition is expected to close in the early third quarter of 2026, subject to customary closing conditions.

GE Vernova currently employs more than 2,400 people across six manufacturing and office locations in Canada, supporting projects in power generation, transmission, storage, and grid technologies.

NEWS III

Apave Group Expands Rail Inspection Capabilities with DEKRA Rail Acquisition Through CERTIFER



Image Source - @Apave

Apave Group has announced the acquisition of DEKRA's rail activities through its specialised subsidiary CERTIFER, strengthening its position in the railway Testing, Inspection & Certification (TIC) sector and expanding its technical capabilities in rail safety, materials testing, and asset integrity services.

The acquisition includes DEKRA Rail's operations in the Netherlands and its rail business activities in Taiwan. The move aligns with Apave Group's AMPLIFY 2030 strategic plan, which identifies transport and sustainable mobility as key growth sectors for the company's future expansion.

Based in the Netherlands, DEKRA Rail is recognised for its expertise in railway safety and regulatory services, including activities as a Notified Body

(NoBo), Designated Body (DeBo), and Assessment Body (AsBo). The company also operates specialised laboratories and provides tribology, calibration, materials testing, and field inspection services for railway infrastructure, operators, manufacturers, and maintenance providers.

The acquisition significantly enhances CERTIFER's testing and inspection capabilities across railway subsystems such as infrastructure, rolling stock, signalling, and control-command systems. Through the integration of DEKRA Rail's laboratories and testing expertise, CERTIFER aims to strengthen its presence across the Benelux and DACH regions while expanding its service portfolio across the entire rail asset lifecycle.

The Netherlands is expected to become one of CERTIFER's largest operational hubs, with more than 100

employees across facilities in Noord-Scharwoude and Utrecht.

In Taiwan, DEKRA Rail's teams have established expertise in Independent Verification and Validation (IV&V) services for large-scale rail and metro infrastructure projects, further broadening CERTIFER's international technical capabilities.

"This transaction marks a major milestone for CERTIFER, perfectly in line with our ambition to become a global leader in TIC services for the rail sector. The integration of DEKRA Rail significantly strengthens our technical expertise in testing, inspection and certification. With our recognised expertise in rail transport, we are consolidating our position as a trusted and independent partner for railway operators, manufacturers and infrastructure managers, in Europe and beyond," said Nicolas Castres Saint Martin.

The integration also supports the growing demand for advanced inspection, maintenance optimisation, and lifecycle management solutions in rail infrastructure, where materials testing and predictive maintenance are becoming increasingly critical for operational safety and asset reliability.

"Joining CERTIFER represents a tremendous opportunity for DEKRA Rail. Becoming part of this leader in the mobility sector allows us to accelerate our development whilst continuing to offer the high level of technical excellence, independence and safety that our customers expect. This is excellent news, both for our employees and for our customers," added Jean-Paul van Hengstum.

The acquisition further strengthens Apave Group's global footprint in technical risk management, testing, inspection, and certification services for the rail and mobility sectors.

NEWS IV

AMETEK to Acquire Indicor Instrumentation in \$5 Billion Deal

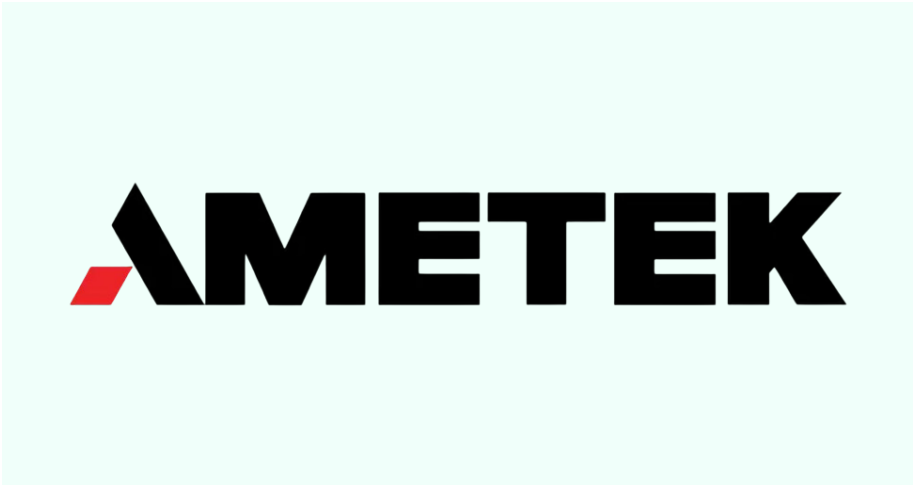


Image Source - @AMETEK

AMETEK, Inc. has announced a definitive agreement to acquire a portfolio of instrumentation businesses from Indicor, LLC in an all-cash transaction valued at approximately \$5 billion.

The acquisition includes Indicor Instrumentation, a group of businesses focused on designing and manufacturing mission-critical

instrumentation and measurement solutions for industrial and scientific applications. The companies serve multiple industrial end markets and maintain recurring revenue streams through consumables, services and aftermarket support.

According to AMETEK, the acquisition aligns closely with its existing instrumentation and industrial technology portfolio, including sectors related to industrial inspection,

measurement, monitoring and process reliability.

David A. Zapico said, "Indicor is an exceptional fit for AMETEK. In a single transaction, we are adding a high-quality group of businesses with differentiated technologies, complementary market positions, and attractive growth prospects. We see meaningful potential to create value through integration into AMETEK's operating model."

Indicor Instrumentation generates approximately \$1.1 billion in annual sales and operates with profitability levels consistent with AMETEK's existing businesses.

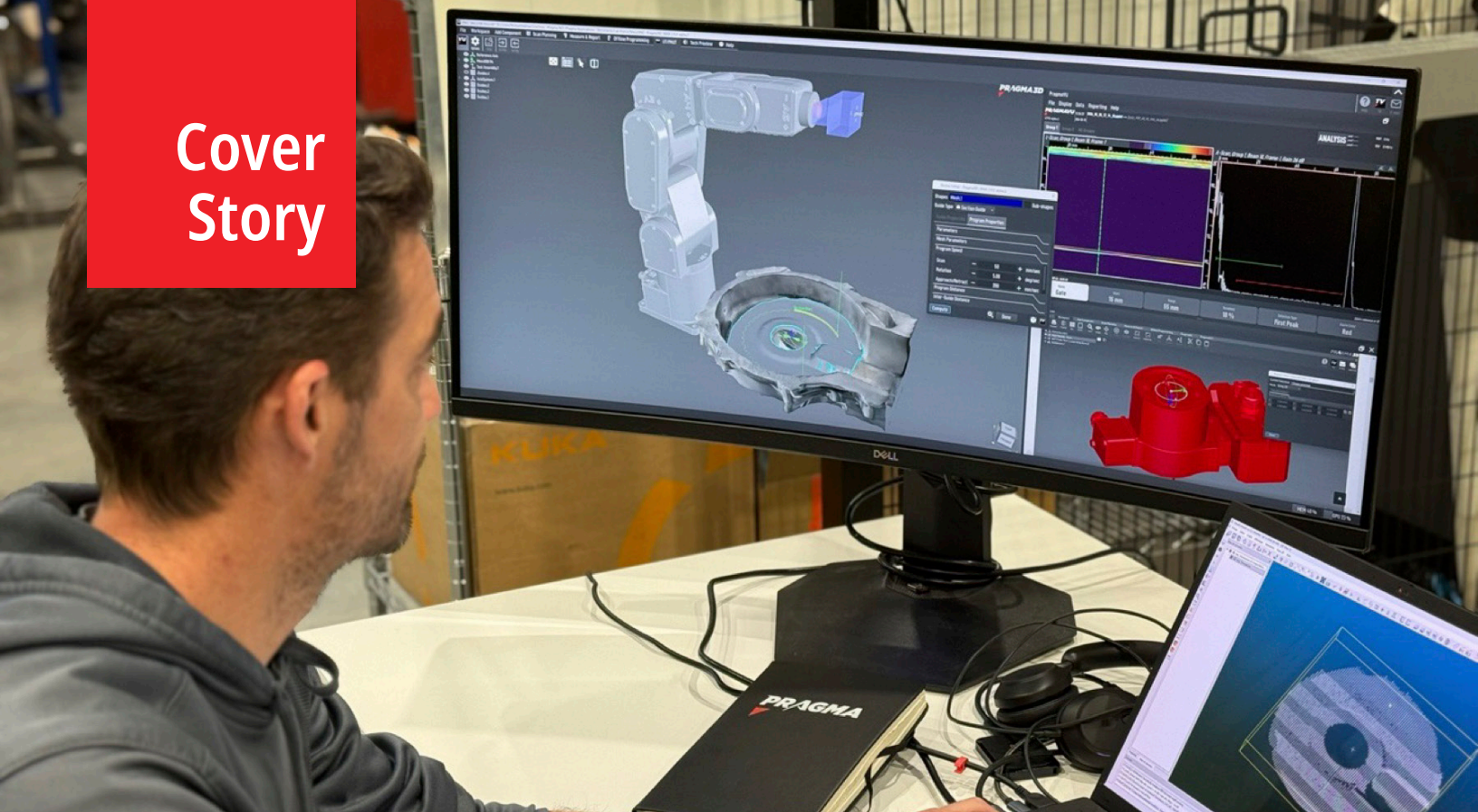
Following completion of the transaction, the acquired businesses will be integrated into AMETEK's Electronic Instruments Group (EIG) and Electromechanical Group (EMG) based on market alignment and product portfolios.

AMETEK stated that the acquisition will be financed through borrowings under its existing credit facility alongside new debt issuance.

The transaction remains subject to customary closing conditions and regulatory approvals and is expected to close during the second half of 2026.



Cover Story



From Compliance to Digital Understanding: Why NDE 4.0 Must Become a Regulatory Standard

by François Mainguy, PRAGMA Solutions NDT Inc., and Robert Ginzel, Ginzel & Associates Ltd.



Introduction: A Turning Point for the NDE Industry

For decades, non-destructive evaluation (NDE) has relied on standards, certification schemes, and regulatory frameworks designed to ensure safety, reliability, and consistency across critical industries. These systems created a common technical language between inspectors, manufacturers, operators, and regulators, and they played a fundamental role in improving industrial safety worldwide.

At the same time, inspection technologies evolved dramatically. Today, the NDE industry is entering a new phase where digital technologies are no longer experimental concepts or isolated pilot projects. High-resolution imaging, 3D inspection systems, robotic scanning, advanced visualization software, cloud-connected databases, artificial intelligence, and digital twins are already being deployed successfully in real industrial environments.

The challenge facing the industry is therefore no longer technological maturity. The challenge is adoption.

In many sectors, critical inspection information is still delivered through fragmented reports, static screenshots, spreadsheets, or handwritten notes that can be difficult to interpret outside the NDE department. Valuable contextual information is often lost between inspection, engineering evaluation, maintenance planning, and regulatory review.

This can lead to inconsistent interpretation, unnecessary conservatism, inefficient maintenance decisions, or, in some cases, overlooked risks.

The industry now possesses the tools required to significantly improve this situation. The next logical step is for standards organizations, certification bodies, and regulators to progressively encourage — and eventually require — the use of digital inspection ecosystems and digital twins as part of modern asset integrity management.

From Defect Detection to Engineering Intelligence

Traditionally, NDE methods were primarily focused on defect detection. The objective was relatively simple: determine whether a flaw existed and whether it exceeded an acceptance threshold defined by a code or standard.

Modern industries, however, require a much deeper understanding of asset condition. Operators increasingly need to know the precise geometry of defects, their evolution over time, their spatial relationship with surrounding structures, and their operational impact on equipment reliability and maintenance planning.

This evolution fundamentally changes the role of inspection. NDE is no longer simply a pass-or-fail verification process. It is becoming a continuous source of engineering intelligence capable of supporting operational and strategic decisions throughout the entire lifecycle of industrial assets.

NDE 4.0 technologies make this transformation possible by combining advanced sensors, 3D position-encoding systems, automated scanning, centralized databases, cloud connectivity, and 3D visualization tools with data fusion. The result is a much richer and more complete understanding of the inspected asset.

Several companies across the NDE sector are contributing to this transformation by developing integrated digital inspection ecosystems. PRAGMA, for example, has focused on combining acquisition hardware, traceability, advanced visualization, and workflow management into unified platforms designed to simplify the interpretation and management of inspection data. The objective is not merely to collect larger quantities of data, but rather to transform inspection information into actionable knowledge that can be clearly understood by all stakeholders involved in asset integrity decisions.

Digital Twins: A New Language for Inspection Data

One of the most important concepts emerging from NDE 4.0 is the industrial digital twin.

A digital twin is far more than a simple three-dimensional model. It is a living digital representation of an industrial asset that integrates inspection results, geometry, historical data, maintenance records, and operational context into a single environment. This allows inspection findings to be visualized directly on the actual geometry of the component or structure being evaluated.

In practical terms, this means that corrosion maps, porosities, cracks, surface anomalies, and all other types of indications, or dimensional deviations, can be displayed precisely where they exist on the asset itself. Historical inspections can be compared over time, allowing engineers and maintenance teams to better understand degradation mechanisms and prioritize interventions more effectively.

This significantly reduces ambiguity and it facilitates synergy to engage in corrective actions. Traditional inspection reports often require experienced specialists to mentally reconstruct the real condition of an asset from disconnected information sources. Digital twins greatly reduce this interpretation burden by presenting inspection data directly within its operational context. The information becomes easier to understand not only for NDE specialists,

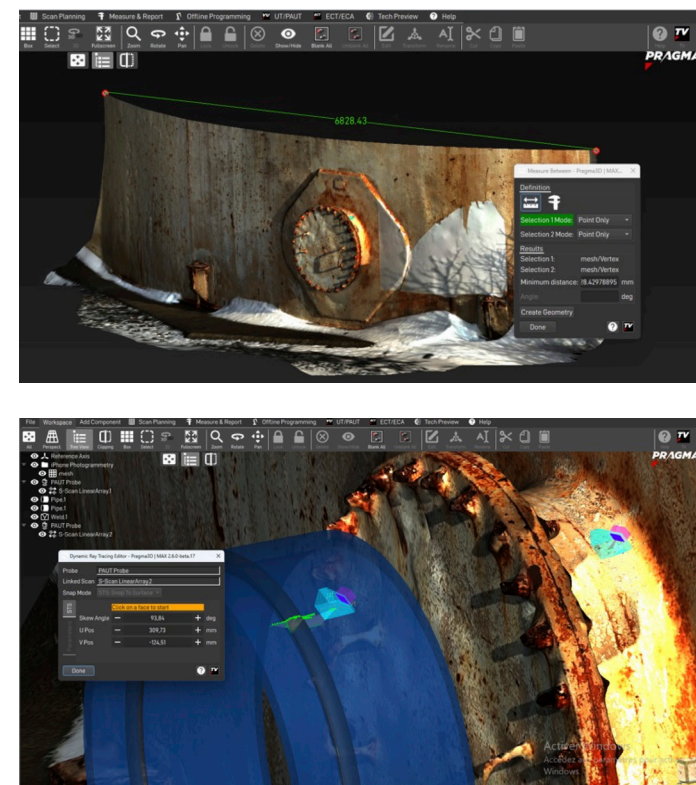


Figure 2 – Example of a nozzle on a storage tank (above). The preparation of the inspection involves a partial optical scan acquired with a smartphone, and a CAD model (below) of the theoretical pipe weld to perform comparative dynamic raytracing simulations.

but also for maintenance planners, engineers, plant managers, auditors, and regulators.

This is becoming increasingly important because industrial decisions are rarely made by a single individual. Inspection results are typically reviewed by multidisciplinary teams composed of people with very different technical backgrounds. Not every stakeholder is an NDE expert, yet every stakeholder must understand the consequences of inspection findings in order to make informed operational decisions.

A well-designed digital twin helps bridge this communication gap.

Tangible Benefits Already Observed in Industry

The benefits of NDE 4.0 are no longer theoretical. Across multiple industries, companies are already observing measurable operational improvements resulting from digital inspection workflows.

Modern systems automatically record acquisition parameters, scan positions, calibration information, equipment settings, and operator actions, improving traceability and auditability while reducing the risk of incomplete or inconsistent documentation. Automated and encoded scanning systems also reduce dependency on

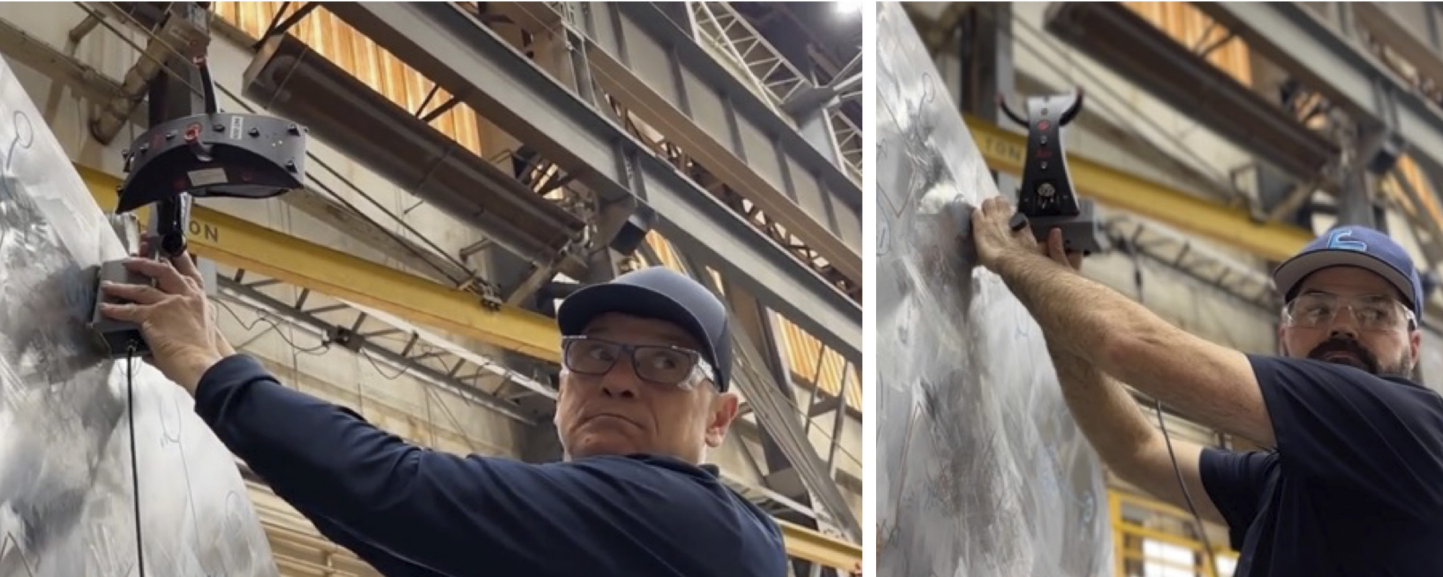
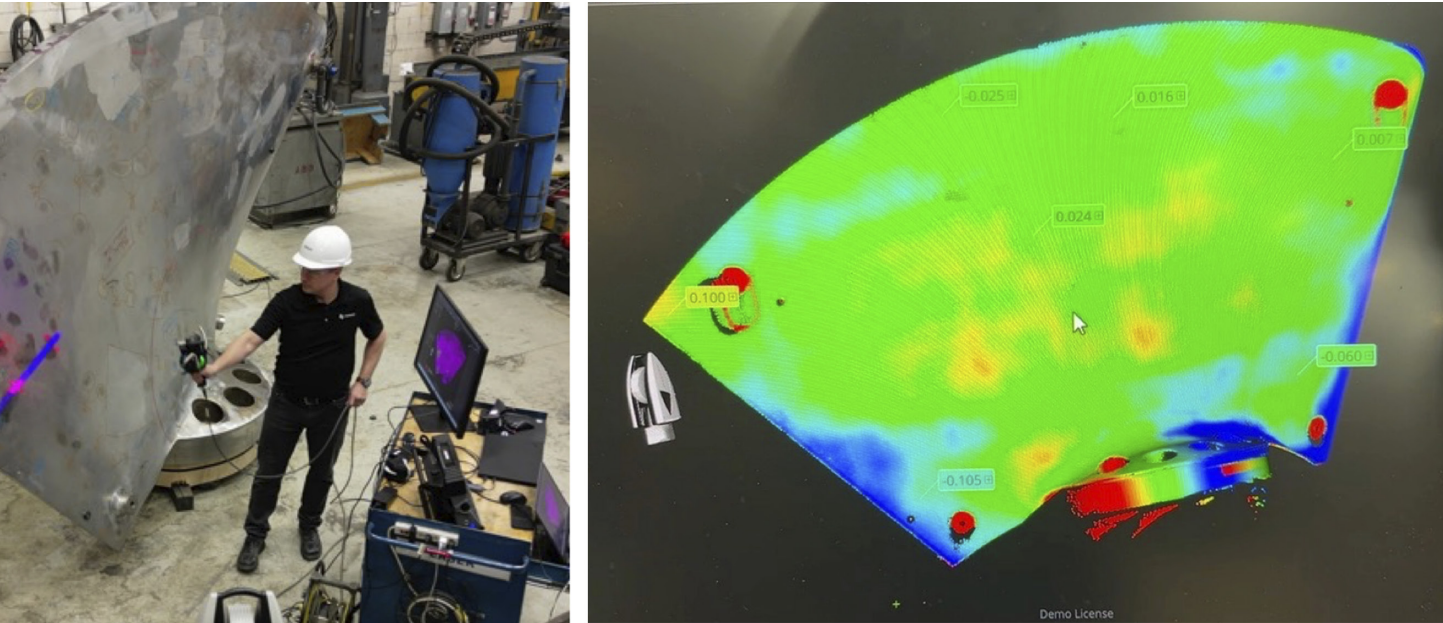


Figure 3 – PRAGMA's digital twins can combine optical metrology surface data (above) with NDE inspection data like ECA (below, left) and micro-topography (below, right).

manual interpretation and improve repeatability between inspections performed months or years apart.

At the same time, advanced visualization environments help reduce misunderstandings between technical and non-technical stakeholders. When a corrosion area or crack indication is displayed directly on a digital model of the inspected asset, the probability of misinterpretation decreases substantially.

Centralized digital inspection databases also enable more effective long-term asset monitoring. Because data is structured and accessible, inspections can be compared over many years with greater consistency, supporting predictive maintenance strategies and risk-based inspection programs.

Operational efficiency improves as well. Automated scanning systems and digital workflows reduce manual reporting efforts and accelerate decision-making processes. Inspection teams spend less time assembling reports and more time analyzing asset condition and supporting engineering decisions.

These technologies also help address another growing challenge facing the NDE industry: workforce transition. Many sectors are experiencing a shortage of experienced

inspectors as senior personnel retire. Digital tools and intuitive visualization systems can facilitate knowledge transfer between generations and help less experienced personnel better understand complex inspection data.

Regulation Has Historically Driven Safety Improvements

Historically, major improvements in industrial safety have often accelerated only after regulations and standards evolved to incorporate new best practices. Radiography procedures became standardized. Personnel certification became mandatory. Pressure equipment inspection intervals became regulated. Traceability requirements became increasingly rigorous.

In each case, regulation transformed recommended practices into industry-wide norms. NDE 4.0 technologies now stand at a similar turning point.

For many years, advanced digital inspection concepts were viewed as speculative or impractical due to limitations in hardware performance, storage capacity, software interoperability, and computing power. Those barriers are rapidly disappearing. Modern industrial systems now offer affordable high-performance computing, cloud infrastructure, advanced visualization tools, high-speed acquisition systems, and robust industrial connectivity.

The technology is no longer hypothetical. It already exists and is being deployed successfully in the field.

What remains inconsistent is the level of adoption across industries. Some organizations are aggressively modernizing their inspection ecosystems, while others continue relying on legacy workflows that provide limited traceability & fragmented inspection data. This inconsistency creates unnecessary operational & safety risks.

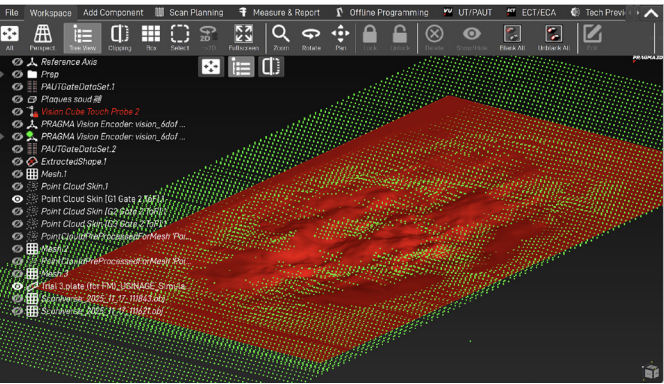
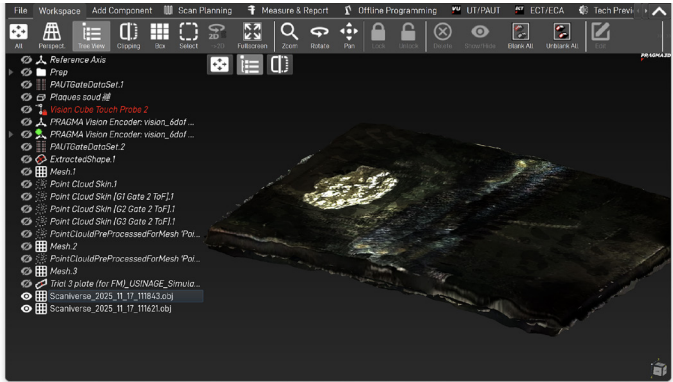


Figure 4 – Example of advanced visualization correlating the PAUT ultrasound corrosion point cloud with the photogrammetry scan of the part, for procedure development.

Why Standards and Regulations Must Evolve

When digital technologies can significantly improve understanding, traceability, communication, and long-term asset monitoring, their use should not remain optional indefinitely in critical industries.

Regulators and standards organizations now have an opportunity to modernize inspection requirements by progressively encouraging digital inspection records, encoded acquisitions, centralized databases, interoperable data formats, and digital twin integration within asset integrity programs.

This does not mean replacing certified inspectors or eliminating existing codes and standards. On the contrary, digital ecosystems strengthen the value of certification by providing inspectors and engineers with more powerful, more reliable, and more transparent tools.

The objective is not automation for the sake of automation. The objective is improved industrial understanding.

A modern digital inspection ecosystem enables inspectors, engineers, operators, asset owners, and regulators to work from the same comprehensive and contextualized source of information. This improves confidence in inspection results, accelerates decision-making processes, and ultimately contributes to safer industrial operations.

Conclusion: The Industry Is Ready

The NDE industry has always evolved alongside technological progress. Today, digital inspection technologies have reached a level of maturity that supports the creation of a new generation of standards and

regulatory expectations.

The transition toward NDE 4.0 will not happen overnight. It will require collaboration between standards organizations, regulators, inspection companies, asset owners, and technology providers. Interoperability, cybersecurity, long-term data management, and data ownership will all require careful consideration.

However, the overall direction is becoming increasingly clear.

Future inspection systems will not simply detect flaws. They will create persistent digital knowledge of industrial assets throughout their operational lifecycle. The organizations that embrace this transformation early will gain improved operational awareness, stronger traceability, better maintenance planning, and reduced long-term risk. More importantly, they will help create a safer and more understandable industrial environment for everyone involved in industrial inspection and asset integrity management. The technology is ready. The industry is ready.

Now, standards and regulations must evolve to fully leverage the capabilities of modern NDE.



PragmaFlex NDE 4.0 Instrument

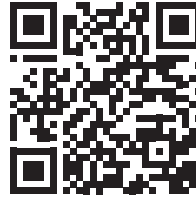


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Expert
Talk

From Early Tomography
to AI-Driven Inspection:

Davide
Baratto on
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With over three decades of international leadership experience across automotive innovation, industrial radiology, medical imaging, and advanced manufacturing, Mr. Davide Baratto has built a career defined by technological vision, entrepreneurial courage, and global expansion. From patented inventions in automotive safety to leading multinational organizations and pioneering NDT imaging advancements, his journey reflects a rare combination of engineering depth and strategic leadership. In this conversation with OnestopNDT, he shares insights into innovation, leadership, global expansion, ethics, AI integration, and the future of industrial and medical imaging.

Q: Mr. Baratto, welcome to OnestopNDT—it’s a pleasure to have you with us. To begin, you bring over three decades of global leadership experience across Europe, North America, and South America. **Could you walk us through your journey and how your career evolved from technical and R&D roles into CEO and board-level leadership?**

A: Thank you for having me here! I started in automotive through a Total Quality Management internship, where I led the ISO 9001 documentation. That experience gave me a systems view of how an organization really works. Then I was hired in the engineering department, and after a few weeks, I invented a way to build an inertial sensor able to prevent cars from

catching fire after accidents. This design was later patented, and the project was successfully adopted by most car manufacturers. I am very proud of that first patent since it probably saved several lives all over the world.

After this, I was hired as a technical manager in a company designing X-ray and UT NDT equipment. There, I started learning about NDT. We designed a new high-frequency gas-insulated monoblock for in-field radiography that, at that time, was quite innovative.

We also designed and realized one of the first tomography systems for NDT applications in the world. I remember it would take hours to reconstruct just one section of the inspected part. It was very primitive equipment, but we did it with a computer that had a memory RAM of 1MB and a 20MB HD! I remember we wrote the algorithms and used a digital camera with an image intensifier to acquire the images. It was a daunting task, a real technological nightmare, but we persevered until it worked.

We were essentially “connecting dots” that the industry hadn’t even defined yet. Managing a tomography reconstruction with only 1MB of RAM required us to be incredibly efficient with our resources, a lesson in strategic efficiency that I still apply today as a CEO.

After this, I wanted to have experience abroad, so I moved back to automotive and went to work in the US on innovative projects to reduce fuel consumption and pollution. It was a great challenge, and we had very good results using an electrical water pump to cool the engine instead of the normal mechanical pumps. This way, it was possible to better control the temperature of the engine and reduce the energy consumption required for cooling.

I then participated in opening a

new production plant in the US for automotive cooling fans and worked between Mexico and China to transfer the production of electric motors from plants in the two countries.

After that, I moved to Brazil to manage an automotive company producing air conditioning pipes. After three years, I resigned and founded a company for quality inspection and reworking in the automotive industry. We created a very innovative system to share real-time reporting information with customers, and the company grew to 250 employees in less than two years. After six years, I sold that company and founded a company distributing NDT X-ray equipment in Brazil, and we gained a very high market share over the years.

Due to this success, I was then called to manage Gilardoni X-Ray equipment in Italy, which I did from 2017 to 2024, bringing the company from 27 to 44 million euros in turnover, renewing the product portfolio, and promoting innovation.

Now I have moved to lead a company in the medical radiology business. A new challenge in X-ray technology!

Q: You’ve successfully led both multinational organizations and agile startups, often through growth, turnaround, and transformation phases. From a leadership standpoint, **what are the most critical elements required to scale innovation into sustainable business value?**

A: Innovation requires the courage to fail. It is difficult to find companies and people who are willing to take risks. This is typical of entrepreneurs who have an idea and follow a vision to create value for the market by being different and innovative, or of large multinationals that can afford to invest part of their capital in new ideas.

Innovation requires the ability to look at common things from a different perspective. This is possible by mixing different experiences and competencies in an environment that is open to change and new ideas. The focal point must always be to create value for the market. Value for the market will revert into value for the business and for the shareholders.

Q: Innovation has been a consistent theme in your career, including patented inventions in automotive and industrial radiology. **How do you foster a culture where innovation thrives while still meeting commercial, regulatory, and operational realities?**

A: Regulations, commercial needs, and operational limitations are ingredients for innovation. Innovation is a way to solve problems in a new way, so problems are the fuel for innovation if you keep an open and positive mindset.

In Brazil, for instance, the local regulations are very restrictive for X-ray equipment due to the bad experience they had with the Goiânia accident involving radioactive materials. This regulation made it very difficult for companies to adopt X-ray equipment for NDT applications. But this was exactly the starting point for a new patent of mine—a system able to drastically improve safety in X-ray fluoroscopic and tomographic cabinets. I invented and patented a new way to guarantee operator safety, and the equipment was granted a unique exemption from strict safety requirements by the local nuclear energy commission. This gave us a great advantage in marketing our products to small and medium companies that could not fulfill the standard Brazilian heavy requirements for radiological safety.



Q: Having served as CEO and COO at Gilardoni X-ray and Ultrasounds, **how did your leadership priorities shift when managing full P&L responsibility compared to earlier operational or technical roles?**

A: Clearly, acting as CEO or COO requires a broader view of the business and of the company you lead. I think the real secret is to always maintain an entrepreneurial mindset. The limits of your responsibility should never limit your vision of the overall effects of your actions and decisions. The company is a complex community that must always keep its focus on creating value for the market. This is key at any level or role: cooperation toward the creation of value for the market.

Q: Your experience spans medical imaging, industrial radiology,

computer vision, and AI-driven automation. From a strategic perspective, **how do you evaluate which technologies are truly transformative versus those driven mainly by market hype?**

A: Technology is transformative when it allows problems to be solved that otherwise could not be solved. I also think that real transformation often requires different technologies to be ready simultaneously. For instance, tomography in NDT is now being adopted more and more because both the algorithms and the hardware are evolving to achieve the required resolution inspection speed. This involves new computers, new algorithms, new detectors, and new X-ray tubes with smaller focal spots being available. All of this together makes the difference and transforms

a possibility into reality in the NDT industry.

Q: You’ve played key roles in international expansion, M&A, and market development across different continents. **What leadership lessons have you learned about building high-performance teams across diverse cultures and business environments?**

A: Coordinating people from different countries and cultures can be a challenge. Communication can be a problem—not because of language, but because of cultures, habits, laws, and regulations. It is a challenge, but it can also be a great opportunity and a unique resource: people from different countries can add different perspectives and experiences to the team and help create value and find solutions.

Q: With your background in industrial radiology and NDT equipment distribution—particularly through ventures like NDB Vision—**how do you see the role of industrial imaging and NDT evolving alongside advances in digitalization and AI?**

A: AI can be a game changer since it can help solve problems that would otherwise be very challenging. AI (neural networks) has been used for many years to improve image quality (noise and artifact reduction, automatic defect recognition and classification, etc.), but now a further step can be imagined by integrating the entire production and inspection process with much better results. I think AI still has a lot of potential in digital imaging and in the automation of inspection in a reliable and faster way.

Q: Recently, you represented Villa Sistemi Medicali at WHX Dubai, showcasing Italian innovation in medical imaging on a global stage. **What does participation in such international forums mean for technology visibility, partnerships, and future market growth?**

A: WHX in Dubai is a very important occasion to meet professionals from all over the world. The change of the name of the event from Arab Health to World Health Expo is not just a detail. Dubai is the perfect place to gather people from all over the world, and the 2026 expo was a very good success and gave us good visibility. Italy is one of the most advanced countries in X-ray technologies. Several Italian companies are dedicated to developing X-ray technology, and like in no other country in Europe, in Italy you can find manufacturers of X-ray tubes, generators, and complete equipment for several applications of X-ray technology: medical, industrial (NDT),

security (baggage inspection), food inspection, veterinary, etc. Italy has been a pivotal player in X-ray technology for a century, blending solid heritage with cutting-edge innovation. We are still able to propose innovation and solid and reliable design, and this is appreciated all over the world.

Q: As a management consultant supporting corporate revitalization and strategic realignment, **what common leadership challenges do you most frequently encounter in technology-driven manufacturing and imaging companies?**

A: The challenge is always to support innovation and to keep the focus on value for the market. Value for the shareholders is the result of the value created for the market—not the other way around. To innovate, you must accept the risk of failing. You need to have a vision of the future and be able to motivate people to go beyond their limits. Companies can have dark moments throughout their history, but it is important to rediscover the idea and the values they were created for by the initial entrepreneur. As Simon Sinek wrote in his book, we always need to “start with why” we do what we do.



Q: Ethics and integrity are themes you often highlight in leadership. In highly competitive, innovation-driven industries, **how do leaders balance rapid growth ambitions with long-term responsibility and trust?**

A: The modern market is very competitive and demanding. It is important to be fast but also sustainable. A short-term vision is very dangerous nowadays. One of the main challenges is attracting, motivating, and retaining the best people. People are the soul of any company. Talent is very rare, and the only way to engage it is to have a long-term vision and ethical leadership. Employees—and not only markets—are becoming more demanding and challenging every day.

Q: Shifting briefly to a personal note—outside boardrooms, innovation discussions, and global travel, how do you like to spend your time? **Are there hobbies or interests that help you recharge and maintain perspective as a leader?**

A: I love reading. I read books of any kind. I like history, philosophy, psychology, science, but also poetry and literature. I also love to travel and discover new places. Italy is a beautiful country with small villages and diverse landscapes. I am lucky—I live on the shores of Lake Como and spend my summers in Costa Smeralda in Sardinia, where I grew up and where my mother still lives. Beautiful places. When I travel for business, I always try to use the opportunity to spend a few days in the place I travel to. I love discovering new cities and new places.

Q: You're also actively involved in organizing TEDx Lecco, which focuses on ideas worth spreading. **How important is storytelling and**

thought leadership for CEOs in shaping industry dialogue and inspiring teams?

A: I spend some of my free time organizing TEDxLecco. It is a way to contribute to my community but also a way to meet very interesting people from whom I learn a lot. I think the target of TEDx is to help you find new questions more than to find answers. I believe questions are far more important than answers. The ability to communicate is one of the most important skills for a leader. A leader should inspire people. Storytelling is key to getting your people passionate and motivated about the challenges they need to face. This is essential to energize the team and keep it focused even in difficult situations.

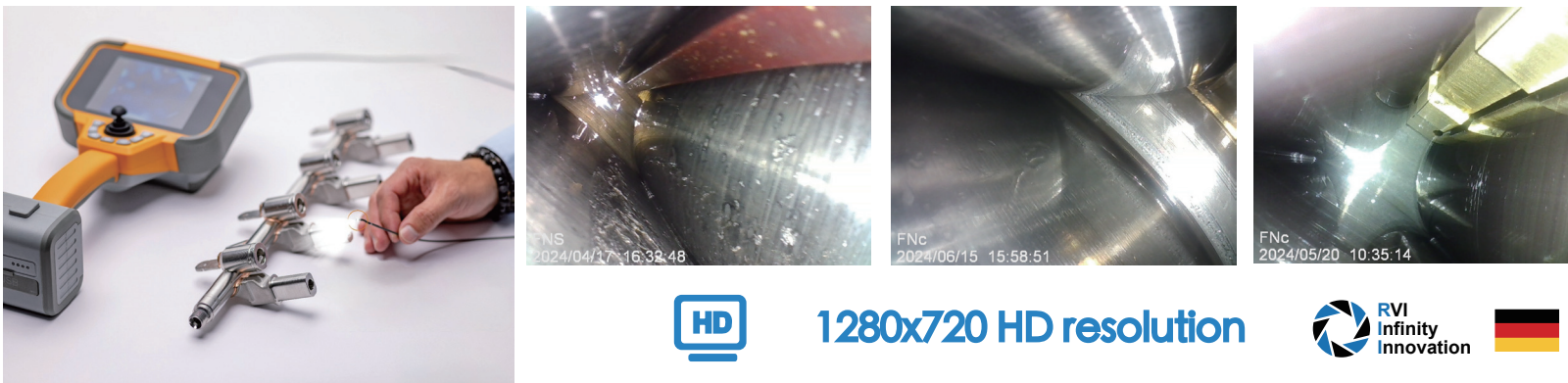
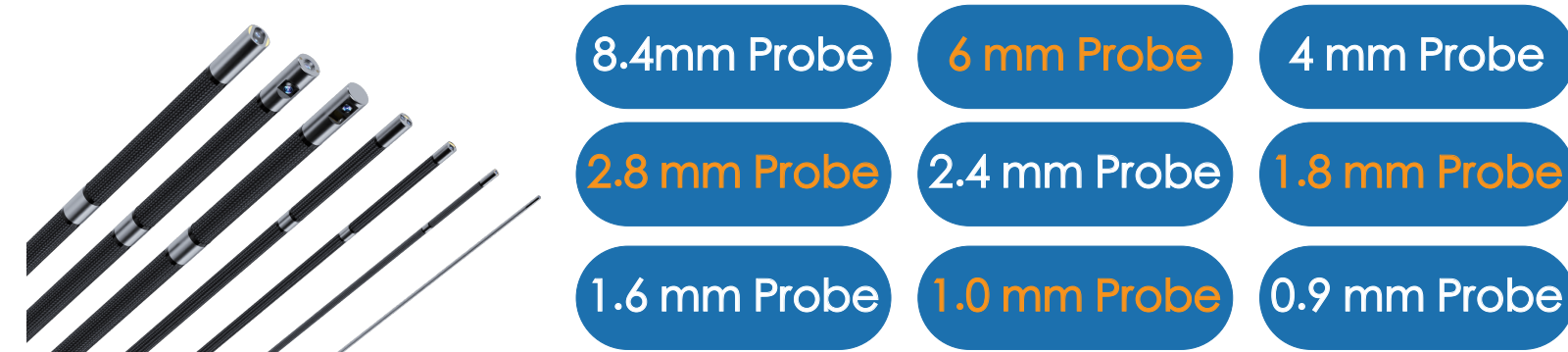
Q: Looking ahead, **what leadership capabilities do you believe will be most essential for CEOs navigating the future of industrial imaging, medical radiology, and advanced manufacturing?**

A: Leadership is not dependent on the industry. Leadership depends on your ability to connect with people. Communication, empathy, listening, credibility, energy, and passion are essential. A leader is a person who needs to lead other people. Humanity remains central. Beyond humanity, I believe a CEO must have the courage to decide. In high-tech industries, we often wait for perfect data, but waiting is the most expensive choice you can make. Leadership is about making the best possible decision with the available information to keep the “innovation engine” running.

Q: Finally, platforms like OnestopNDT aim to connect industry leaders, technologists,

and practitioners across inspection, imaging, and quality ecosystems. **From your perspective, how valuable are such platforms in accelerating innovation, collaboration, and informed decision-making globally?**

A: I consider platforms like OnestopNDT to be absolutely vital—almost a necessary infrastructure for our industry. If we accept that innovation is no longer about a “lone genius” in a lab, but rather the intelligent combination of existing technologies and diverse expertise, then these platforms are the laboratories where the “chemical reaction” happens. They accelerate decision-making by cutting through the noise. They allow an entrepreneur to quickly find the right partners to complete their “technological puzzle.” These platforms effectively shrink the global market into a local ecosystem, making collaboration not just possible, but immediate and effective. Mr. Baratto's career illustrates how technological innovation, entrepreneurial courage, and ethical leadership can converge to create lasting impact across industries and continents. From pioneering early tomography systems to leading global imaging companies, his journey underscores the importance of vision, resilience, and humanity in leadership. As industrial and medical imaging continue evolving through digitalization and AI, his insights provide valuable direction for leaders shaping the future of high-technology industries.



Expert Article

The Legal Framework & Implications of the EU Data and Artificial Intelligence Acts on Nondestructive Testing and NDE 4.0



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Abstract

Data-driven networking and interoperability make nondestructive testing (NDT) a key provider of safety-critical quality data for Industry 4.0. However, the EU Data Act and Artificial Intelligence (AI) Act will fundamentally reshape how this data is accessed, shared, and utilized. While many view the AI Act with concern, it fundamentally serves as a modern, reasonable extension of existing product liability laws tailored for digital safety components. On the other hand, the Data Act introduces massive structural implications. It creates a legal framework for fair data access, effectively shattering the proprietary data ecosystems of equipment manufacturers while offering unprecedented data sovereignty to users. This article provides an overview of this new regulatory landscape. It explores the legal rights of users, the obligations of equipment manufacturers, enforcement penalties, the protection of trade secrets, and how Data Sovereignty Connectors can technically implement these rules. Ultimately, it highlights how these acts will act as a catalyst for NDE 4.0.

Introduction

Data is the irrefutable backbone of digitalization, digital transformation, and the transition toward NDE 4.0 [1,2,3]. Yet, the full potential of this resource frequently remains unused. In many current-day scenarios, the handling of data—specifically concerning questions of access, use, ownership, and rights—is unclear or heavily enforced by powerful product manufacturers.

The whole situation became obvious a couple of years ago when John Deere locked farmers out of accessing their own machine data. By arguing that their proprietary software collected the data and that the copyright belonged solely to them, John Deere attempted to monopolize the growing market of digital agricultural data. They even cooperated with large agricultural companies to sell this data. [4]

This example shows that connected products often operate as black boxes for the user. Manufacturers sell the hardware, retain exclusive access to the device's data or only support proprietary data formats, and subsequently force the user into their proprietary data ecosystems for any evaluation or service. It's like a car manufacturer requiring you to get service only at their facilities and to buy accessories exclusively from them. In the authors view, this might be a good business model for the manufacturers, but the European Commission has determined that this dynamic is not in the best interest of the economy and society. It prevents the utilization of data to its full potential and actively hinders the development of a competitive, innovative market for data-driven services.

The EU's response is an ambitious strategy shown in Fig. 1 aimed at separating the hardware market from the data-services market, allowing users to easily and freely access their data. Within this push for digital sovereignty, two primary pieces of legislation have emerged with distinct philosophies: the AI Act, which modernizes established safety and liability doctrines, and the Data Act, which actively restructures market economics.

European Data Strategy

The European Data Strategy [5,6,7,8,9,10] aims to protect users and to create a market for data, ensuring data sovereignty and leading to the creation of unified data spaces. To support this strategy, multiple acts and regulations have been implemented.

The foundation was laid in 2018 with the General Data Protection Regulation (GDPR) [11], which ensures the protection and free movement of personal data. In 2022, the Data Governance Act (DGA) [12], the Digital Markets Act (DMA) [13], and the Digital Services Act (DSA) [14] came into force. These laid the foundation for data exchange models and prevented large "gatekeeper" companies from abusing their market power.

In 2023, the Digital Operations Resilience Act (DORA) [15] and the NIS 2 Directive [16] increased cybersecurity resilience across various sectors. Finally, in 2024, the cornerstone acts directly impacting industrial data and systems—the EU Data Act [17], the AI Act [18], and the Cyber Resilience Act (CRA) [19] —entered into force.

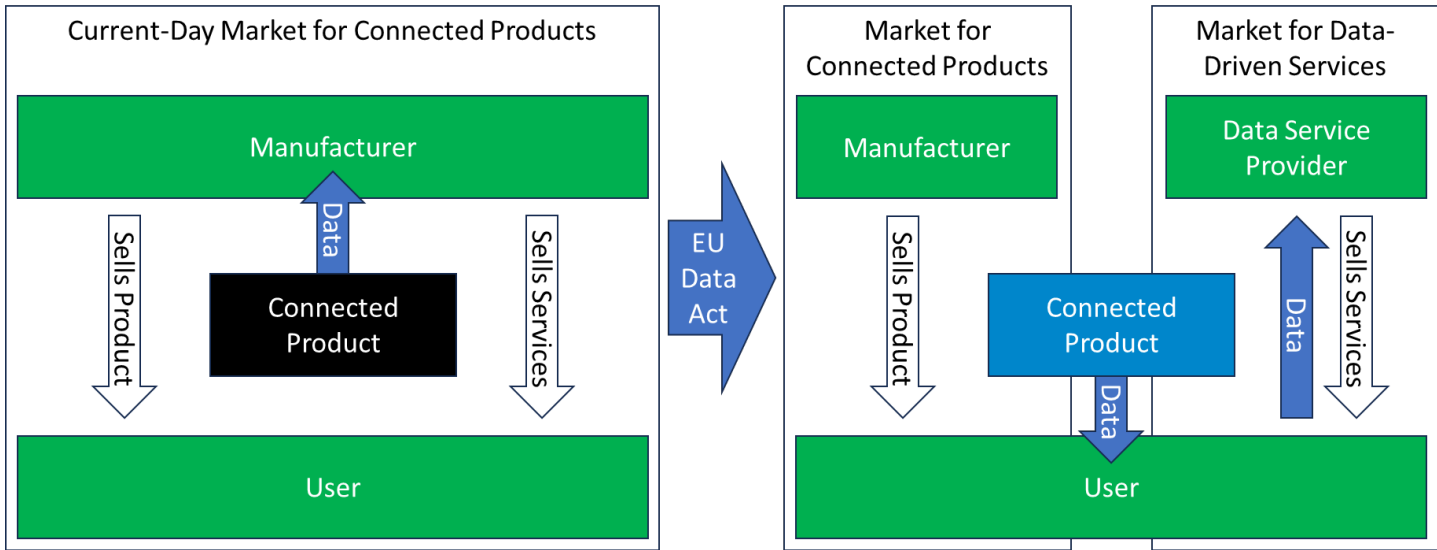


Figure 1 left: Current Situation (Product = Black Box) right: EU Data Act (connected product and data service market separated) (Author: Johannes Vrana, Vrana GmbH, Licenses: CC BY-ND 4.0) [6]

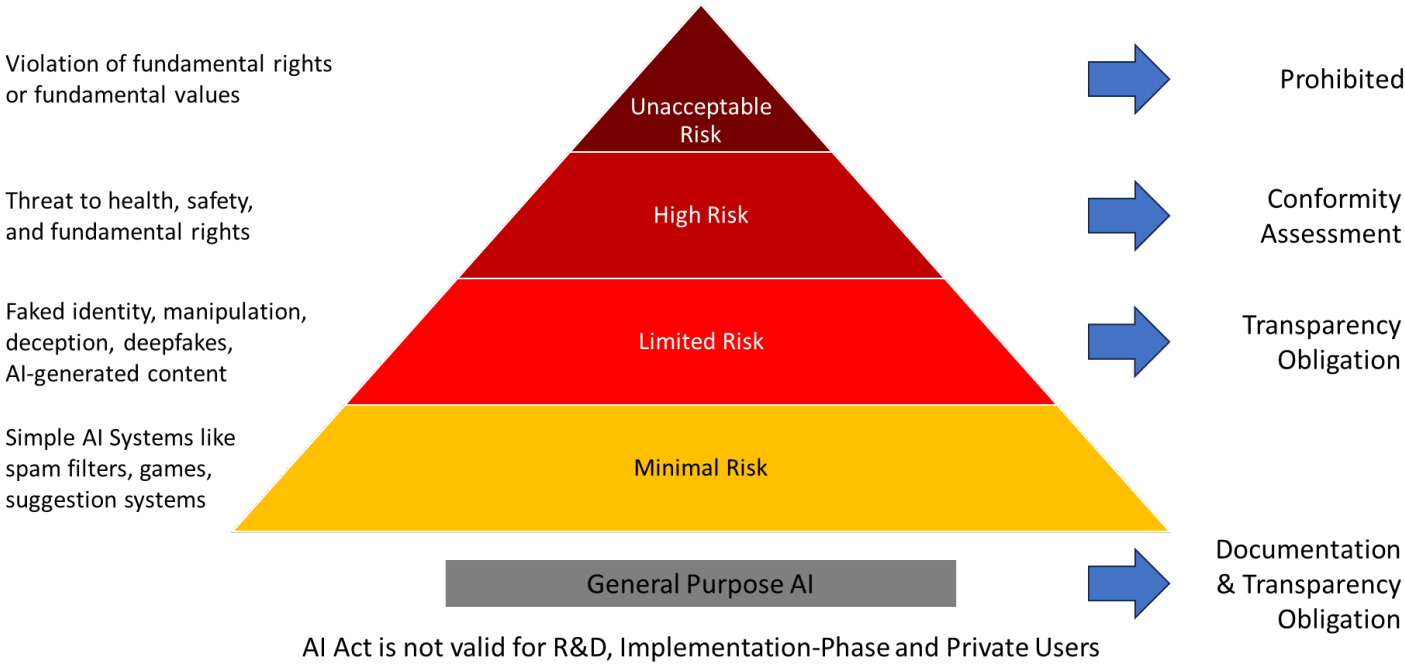


Figure 2: AI System Classification: Can it Harm People (Health, Safety and Fundamental Rights)? (Author: Johannes Vrana, Vrana GmbH, Licenses: CC BY-ND 4.0)

The AI Act: A Reasonable Extension of Product Liability

The EU AI Act entered into force on August 1st, 2024, and will become fully applicable on August 2nd, 2026. While the AI Act has caused significant industry concern, in the view of the author, it is a highly logical and reasonable extension of existing product safety and liability laws [20].

In 1985, the Product Liability Directive established the principle of "liability without fault" for producers of defective movables to ensure a fair apportionment of the risks inherent in modern technological production. The AI Act extends this exact safety-first approach to the digital realm. The regulation explicitly clarifies that it complements existing product safety laws, ensuring that all rights and remedies for the compensation of damages remain unaffected.

Instead of reinventing the wheel, the AI Act heavily focuses on AI systems that function as safety components of products, such as machinery, pressure equipment, or medical devices. To ensure consistency, providers of products containing high-risk AI systems can integrate the necessary AI risk-management and quality control testing directly into the conformity assessments they already perform under the New Legislative Framework.

It is important to note that the regulation's definition of an 'AI system' extends far beyond modern neural networks,

encompassing also logic- and knowledge-based approaches that infer outputs from encoded knowledge. However, traditional software based solely on hardcoded rules defined by humans to automatically execute operations without inference is explicitly excluded.

The regulation classifies AI systems strictly by their potential to harm people (see also Fig. 2):

- **Prohibited AI Systems:** Systems designed to exploit vulnerabilities, untargeted scraping of facial images from the internet or CCTV, and the use of AI to infer emotions in the workplace or educational institutions.
- **High-Risk AI Systems:** This encompasses AI systems used as safety components for machinery and critical infrastructure. Providers must establish robust Quality Management Systems, maintain detailed technical documentation, and ensure logging capabilities. Deployers (users) must ensure human supervision and verify the quality of input data.
- **Limited-Risk AI Systems:** Simple generation systems face transparency obligations, such as informing persons they are interacting with AI.

Most AI-based NDE systems will be classified as high-risk under the EU AI Act because they serve as safety components for critical infrastructure and machinery.

Unless an application is strictly for non-safety-critical purposes (like evaluating art) or pure research, industrial NDE systems directly impact health and safety, meaning they must comply with strict high-risk regulatory obligations.

The EU Data Act and the NDT Industry

If the AI Act is a modernization of safety and liability, the EU Data Act is a disruptive force with massive implications for equipment manufacturers, offset by immense benefits for users. The Data Act regulates access to and use of data generated by connected products and related services. It applies directly to all connected products placed on the EU market, irrespective of where the manufacturers are headquartered.

A “connected product” is defined as an item that obtains, generates, or collects data concerning its use and can communicate this data electronically. A “related service” is any digital service or software connected to the product in such a way that its absence prevents the product from performing its functions.

- In the NDT market, this covers three typical scenarios (see Fig. 3):
- Connected standalone NDT devices (e.g., portable devices with Wi-Fi or Bluetooth).
 - Integrated NDT devices (e.g., equipment and sensors intended for integration into an automated inspection system).
 - NDT inspection systems (complex systems integrating multiple connected products, where the system integrator is responsible for compliance).

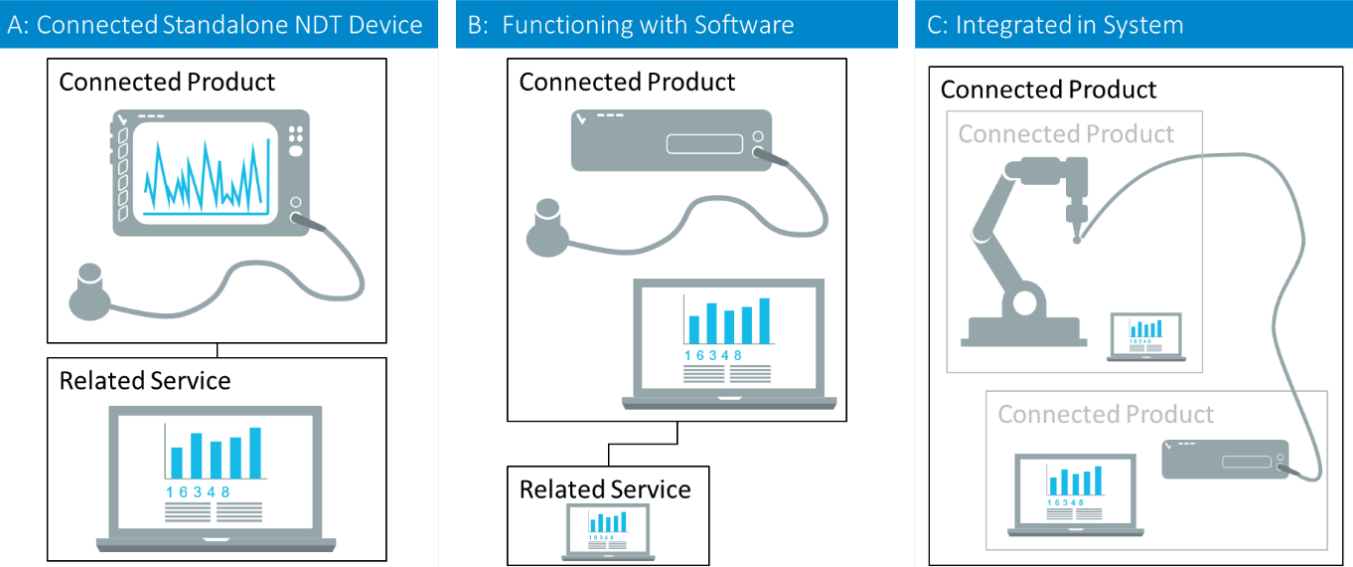


Figure 3: Three typical scenarios for connected products in the NDT market. Left: A connected standalone product which can be connected to a potential related service; Middle: An NDT device which is intended for the integration into an automated inspection system Right: An NDT inspection system (Author: Johannes Vrana, Vrana GmbH, Licenses: CC BY-ND 4.0) [10]

The Data Act places the user in a central position, equipped with three primary instruments:

- **Accessibility by Design (Article 3):** Connected products and related services must be designed so that data and metadata are easily, securely, and freely accessible to the user by default, in a comprehensive, structured, commonly used, and machine-readable format.
- **Indirect Access (Article 4):** Where direct access is not

technically feasible, the data holder must make the data accessible to the user without undue delay, continuously, and in real-time where feasible.

- **Data Sharing with Third Parties (Article 5):** The data holder must, upon request, make the user’s data available to a designated third party (such as a new NDT service provider). Notably, large technology platforms designateas “gatekeepers” under the DMA (e.g., Amazon, Meta) are excluded from acting as eligible third parties.

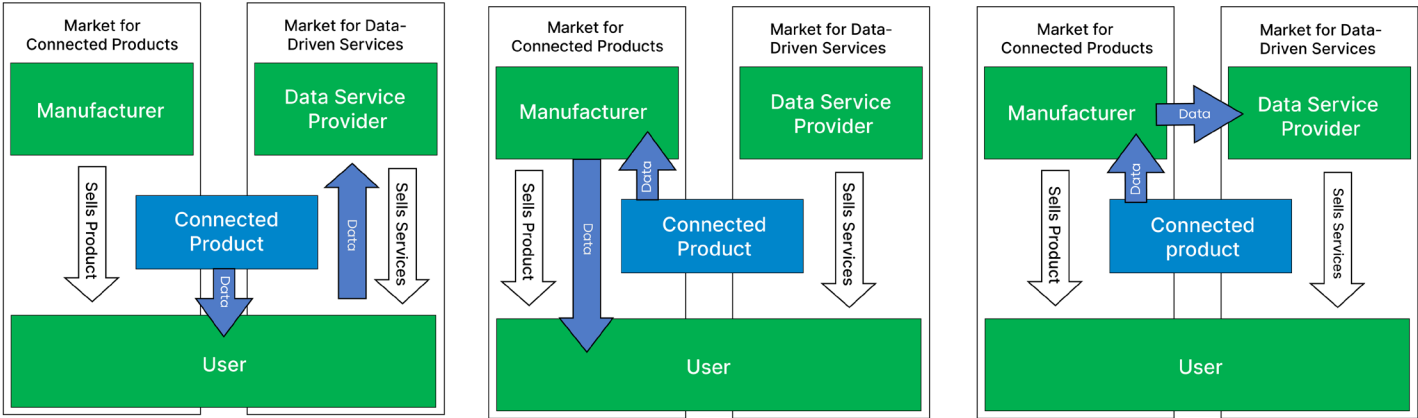


Figure 4 left: Art. 3 Direct Access (accessibility by Design); middle: Art. 4 Indirect Access; right: Art. 5 Data Share with third Party (Author: Johannes Vrana, Vrana GmbH, Licenses: CC BY-ND 4.0) [7]

It is important to note that simple open container files like XML or HDF are insufficient to fulfill the mandate for structured, machine-readable data; true compliance requires semantic interoperability achieved through standardized ontologies.

Enforcement, Contractual Fairness, and Trade Secrets

The financial stakes for noncompliance with the Data Act are severe. Working in conjunction with the GDPR, violations involving personal data can result in fines of up to €20 million or 4% of global turnover. For non-personal data, national implementations (such as the German draft bill) are proposing fines up to €5 million or 4% of the preceding year’s EU-wide turnover. [9]

To prevent exploitation by powerful data holders, Article 13 dictates that any contractual term concerning data access unilaterally imposed on an enterprise shall not be binding if it is deemed unfair. A user’s right to access their data generally cannot be waived, though the European Commission’s Expert Group clarified that narrow B2B exceptions may exist, such as in joint ventures accompanied by fair compensation.

Simultaneously, the Data Act provides vital protections for OEMs regarding their intellectual property. Trade secrets shall be preserved. If a user or a third party fails to implement agreed-upon technical and organizational measures to protect trade secrets, the data holder is legally permitted to withhold or suspend the sharing of that data. Such suspensions must be duly substantiated and reported to the competent national authority.

Technical Implementation: Data Sovereignty Connectors

While contracts define the legal rules of data sharing and trade secret protection, these rules must be technologically enforced to guarantee true data sovereignty. As any cyber security expert knows, a legal contract alone cannot physically prevent a third party from copying an unencrypted file from a USB stick [7].

The technical solution lies in Data Sovereignty Connectors [7], such as the Eclipse Dataspace Components (EDC). In this framework, both the data provider (source) and the data consumer (sink) must utilize certified connectors. The data owner defines specific usage rights which are attached to the data mathematically. The connector at the receiving end uses encryption and software restrictions to physically enforce these policies. For example, it can ensure that a third-party NDT service provider can only view the inspection data once before the software automatically deletes it. This technology actively safeguards the trade secrets referenced in the Data Act and establishes a truly secure market for NDE 4.0 data.

Timelines and Pre-Contractual Obligations

The implementation of the Data Act utilizes a staggered timeline to allow industries with long development cycles to adapt:

- **September 12th, 2025:** General application begins. Users gain the immediate right to request data access, and new contracts must comply with fairness protections

- **September 12th, 2026:** The strict “Accessibility by Design” (Article 3) mandate applies to any connected product placed on the market after this date.
- **September 12th, 2027:** Existing long-term or indefinite legacy contracts must be brought into full compliance.

Crucially, pre-contractual information obligations apply immediately. Before a contract for a connected NDT device is signed, the seller must explicitly disclose the device’s data profile (type, format, and volume), data storage locations, retention times, and detailed instructions on how the user can access and retrieve the data.

Furthermore, the Data Act applies retrospectively to legacy devices. While older equipment does not require retroactive physical redesigning, if an OEM possesses the technical means to remotely access data generated by legacy systems after September 12th, 2025, they are legally bound to make that data available to the user upon request.

■ Conclusion

In the view of the author, this legislation will fundamentally reshape the NDT & NDE industry worldwide. The AI Act, while carrying stringent compliance requirements, should be viewed primarily as a reasonable evolution of the 1985 Product Liability Directive, directly extending established safety-first principles to modern digital safety components.

Conversely, the EU Data Act serves as a structural market revolution. For users, owner-operators, and independent service providers, it brings unprecedented benefits, granting them full legal sovereignty over their own equipment data and the freedom to share it across a newly competitive market. This will enable the emergence of numerous start-ups and drive innovations fueled by NDE 4.0.

For established NDT equipment manufacturers, it represents a massive paradigm shift. Stripped of the ability to use proprietary data formats for customer lock-in, OEMs must fundamentally rethink their business models. They must rapidly adopt “Accessibility by Design” standards and rely on Data Sovereignty Connectors to protect their intellectual property. To survive and thrive in this new era, companies must start implementing the requirements of the Data and AI Acts immediately, as the necessary long-term process adjustments cannot be achieved overnight.

■ Note

The author of this text is not a lawyer and cannot give legal advice. This text represents the opinion of the author and is intended as information for the industry. The implementation of the EU Data Act and the AI Act are highly complex processes that deeply intertwine legal requirements with software, hardware, and data architecture. Consequently, achieving compliance cannot be handled through legal consulting alone; it requires legal counsel combined with specialized technical knowledge. Each company that sees that its business might be impacted by the European Data Strategy should seek interdisciplinary advice from both legal and technical experts.

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Insights

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ISO 9712 vs SNT-TC-1A : What Industry Professionals Need to Understand Today



Nathan Bate

Chief Examiner, Argyll Ruane Limited

Why the distinction matters

The global NDT industry depends on skilled personnel who can carry out inspections with precision and integrity. These professionals are expected to demonstrate their competence through rigorous training, examination, and ongoing performance review.

Most standards, specifications, and design codes that require NDT also require personnel performing it to hold certification under an internationally recognised scheme. This helps ensure that the individuals involved have been assessed as competent for the work they undertake.

Two of the most widely used NDT personnel qualification and certification frameworks worldwide, outside the aerospace sector, are those based on ISO 9712 and SNT-TC-1A. Although both are used extensively across the industry, they differ significantly in their requirements and in the way they are administered.

The distinction between ISO 9712 and SNT-TC-1A matters because it affects how organisations govern competence, how flexibly they can certify personnel, and how portable those certifications remain across an individual's career.

History and development

SNT-TC-1A emerged in the US in the late 1960s as industry's answer to a basic problem: there was no widely accepted, structured way for employers to qualify and certify NDT personnel. The first edition was published by ASNT in 1968 (some industry sources reference development work beginning in 1966), and it created the familiar Level I, Level II, and Level III framework for NDT qualification.

ISO 9712 first appeared in 1992 and superseded the European standard EN 473 when the two were harmonised in 2012. Its intention was to standardise the qualification and certification of NDT personnel and become the global 'gold standard'. Whilst it shares much of the framework of SNT-TC-1A and the now instantly recognisable certification levels (1, 2 & 3) there are significant differences between the two in their requirements and how they are administered.

At a high level, ISO 9712 is a third-party certification model, whereas SNT-TC-1A is an employer-based certification model. That single distinction drives most of the practical differences between the two systems.

For employers, candidates, and clients, the decision is not simply about compliance; it is about balancing governance, flexibility, and workforce mobility within the operating environment.

How the two schemes operate

SNT-TC-1A, published by ASNT as a recommended practice, defines certification as written testimony of qualification. In practice, the key issue is who evaluates the evidence of training, experience, and examination

(qualification) and who has the authority to issue certification.

ISO 9712 is an international standard. To achieve certification under a scheme derived from it, NDT personnel must meet defined qualification requirements. Certification is issued through an independent third-party or central certification body, with schemes such as PCN operating within that model.

Approved Training Organisations (ATOs) and Authorised Qualifying Bodies (AQBs) may support training, examination, and the review of on-the-job experience, but the final certification decision remains with

the independent certification body. The 2022 edition of ISO 9712 also introduced clarifications and updated qualification requirements, including changes affecting experience and alignment with related standards.

As SNT-TC-1A is a recommended practice and not a governing standard, the employer defines the qualification and certification framework through a written practice based on these recommended guidelines, the requirements of which become mandatory within the organisation. This gives organisations greater flexibility to tailor certification to their actual processes, techniques,



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and product scope, which can be a significant operational advantage where inspection activities are narrow or highly specific.

For example, a company that manufactures stainless steel fasteners may only need to carry out water-washable fluorescent penetrant inspection as part of its production process.

In that case, the employer's written practice only needs to define the qualification and certification requirements for that specific method and technique. It would only need to be revised if an additional method or technique were introduced into the scope of operations.

The document has been revised periodically across multiple editions, including 1996, 2001, 2006, 2011, 2016, 2020, and 2024, reflecting changes in technology, examination practice, terminology, and employer expectations.

The flexibility of SNT-TC-1A, however, depends heavily on the

competence and oversight of the employer's Responsible Level III. Whether internal or external, that individual plays a critical role in approving the written practice, maintaining technical control of qualification requirements, and influencing the employer's decision to issue certification. Note that a Level III individual is usually certified by a third-party organisation such as an ASNT NDT Level III whom has been certified by an examination administered directly by ASNT. In some circumstances an SNT-TC-1A 'appointed' Level III maybe certified by the former and accepted by the employer, however this is becoming a much-reduced practice based on guidelines from more recent editions of the recommended practice.

Career portability is another major point of divergence. ISO 9712 certifications remain with the individual, subject to renewal and recertification requirements, whereas SNT-TC-1A certifications are tied to

the employer's written practice and typically lapse when the individual changes employer requiring the individual to be re-examined under the new employer's written practice. For organisations building long-term internal capability, SNT-TC-1A can be efficient; for individuals and clients seeking portable, independently governed credentials, ISO 9712 offers a stronger proposition.

In executive terms, ISO 9712 offers stronger independence, consistency, and transferability, while SNT-TC-1A offers greater employer control and operational tailoring. The right choice depends on whether the priority is external assurance and portability, or internal flexibility aligned to a specific business model.

Industry context and scheme requirements

In practice, the certification scheme required is often determined by the industry sector involved and by the standards, specifications, and design codes that apply within it.

- **UK and European nuclear sectors:** NDT personnel are typically required to hold ISO 9712 certification at the appropriate level, alongside any additional employer-specific competence assessments and internal controls.
- **ASME code applications:** Historically, the ASME Boiler and Pressure Vessel Codes have required personnel to be qualified and certified in accordance with SNT-TC-1A. However, more recent editions have allowed wider acceptance of other recognised international certification schemes, usually subject to agreement between the contracting parties.



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As a result, it is increasingly common for NDT personnel to hold certification under more than one scheme, depending on employer requirements and the sectors in which they operate.

Employer responsibility

Regardless of whether personnel are certified under ISO 9712 or SNT-TC-1A, the employer's responsibility for selecting and authorising competent personnel remains critical. ISO 9712:2022, Section 5.5.2, sets out a range of employer responsibilities, including verifying that personnel hold valid certification relevant to their duties and issuing the written authorisation required for them to operate within the

organisation. In other words, even where the employer does not define the certification framework, overall responsibility for NDT personnel within the organisation still rests with the employer.

Conclusion and future direction

There is no single approach to NDT personnel qualification and certification that suits every industry or operating environment. Different schemes serve different purposes, and the most appropriate choice depends on regulatory requirements, client expectations, and operational needs.

Many sectors favour the more tightly controlled central certification model offered by ISO

9712. By contrast, SNT-TC-1A is sometimes criticised not because of the recommended practice itself, but because of variations in how rigorously employers implement their written practices. Even so, it remains a valuable framework where employer-specific flexibility is essential.

Both schemes are likely to remain in use for the foreseeable future. That said, recent developments suggest a growing preference for independently governed, third-party certification. A notable example is ASNT 9712, introduced in the United States as a standalone third-party programme designed to align with ISO 9712 and replace the ASNT Central Certification Program (ACCP), while historically operating in a market long dominated by SNT-TC-1A.

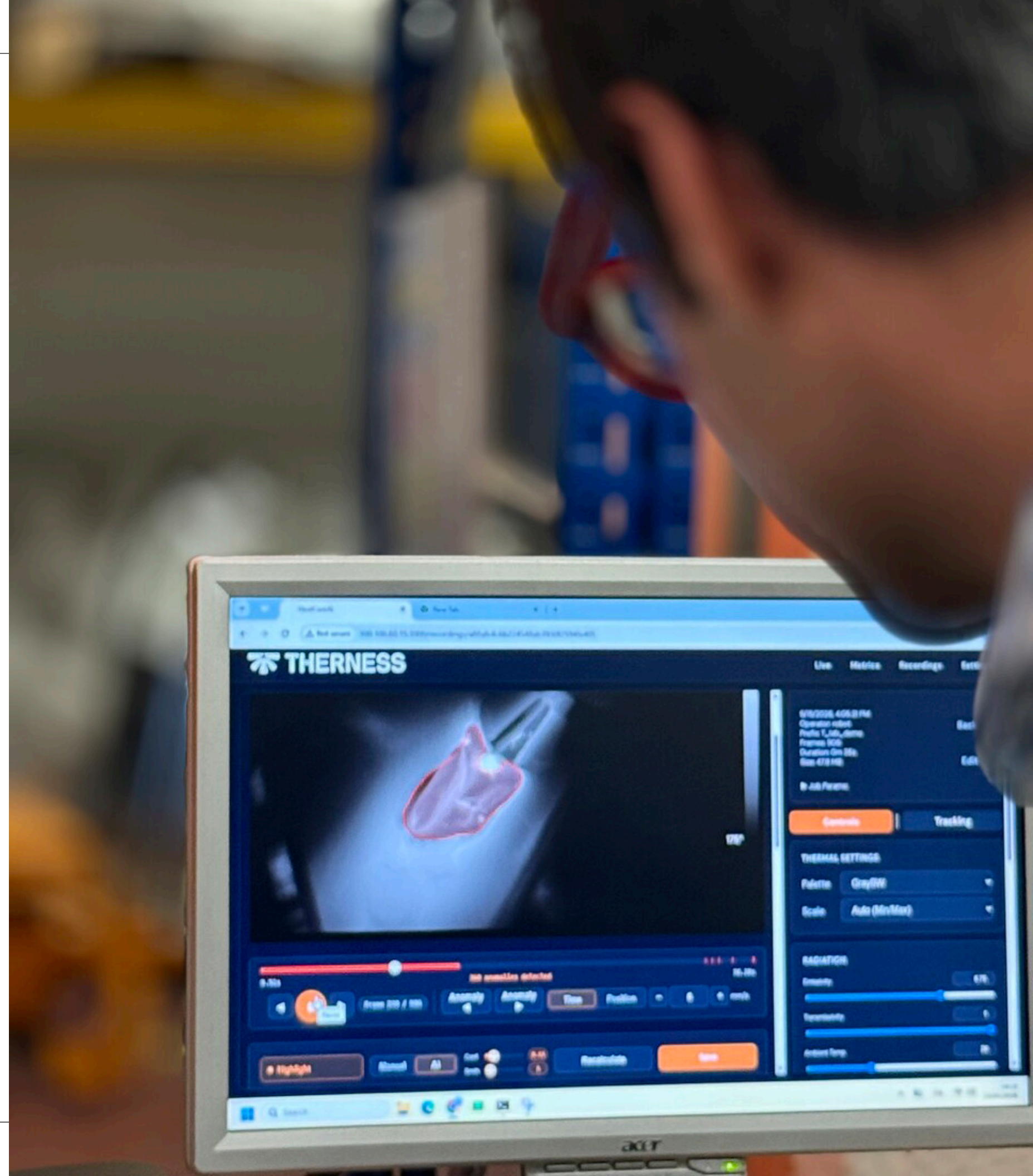


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Startup
to Watch

Bringing In-Process Intelligence to Industrial Welding

An Italian startup redefining weld quality assurance with AI-powered in-process monitoring.



Startup to Watch



How a Politecnico di Torino spin-off is turning thermography and multimodal sensing into real-time, AI-driven weld quality assurance.

For decades, weld quality has been verified after the fact. Inspectors check a finished part with ultrasonics, X-ray, dye penetrant or destructive sampling, & only then do we learn whether a joint is sound. In a one-off pressure vessel that workflow makes sense. In a modern automotive line producing thousands of tubes, radiators or chassis assemblies per shift, it is becoming a structural bottleneck: defects are caught too late, scrap rates eat into margin, and the data that could explain why a weld failed lives in a different system from the one that produced it.

The industry has been talking about NDE 4.0, in-process monitoring and zero-defect manufacturing for years. The hardware is there. The sensors are there. What has been missing is an integration layer that speaks both languages — process physics and the production line — and that can be deployed without ripping out the welding machine the customer already owns.

Enter Therness

Therness S.r.l. is an Italian deep-tech start-up & an official academic spin-off of Politecnico di Torino, one of Europe's leading engineering universities. Founded by a team with combined backgrounds in mechanical engineering, computer vision & industrial automation, Therness develops thermographic and optical monitoring systems for industrial processes,

with a strong focus on welding.

The company's mission is straightforward: move quality control from the inspection bay to the welding head itself. Every weld, every part, every shift — measured, traced, scored and learned from in real time.

The Heatcore Platform

At the heart of Therness' offering is HeatCore, a hardware-and-software platform for in-process weld quality monitoring. HeatCore acquires synchronised data from one or more sensors mounted directly on the welding station — typically a high-speed thermal camera observing the molten pool and its surroundings — and processes it on the fly through a pipeline that combines physics-based feature extraction with machine learning.

What comes out is not a raw thermogram that an operator has to interpret. It is a weld-level quality score, a defect classification, and a structured record that can be pushed straight into the customer's MES or quality system. The system can also issue a real-time discrete signal — for example, to actuate an automatic part-diverter so that suspect components never reach assembly.

HeatCore was designed around three principles that recur in every Therness installation: Vendor-agnostic by design. HeatCore reads the welding machine, but does not require modifying its firmware or PLC logic. It interfaces through standard I/O, OPC-UA or, where useful, simple discrete signals such as a digital output mirroring the welder's active state. This is a deliberate choice: it makes the system installable on an existing line without re-opening CE certification of the OEM equipment.

Multimodal correlation. Thermography is the primary modality, but HeatCore is built to ingest additional signals — laser profilometry for post-weld geometry, acoustic emission, process current and voltage — and to correlate them in a single timeline. A discontinuity that is ambiguous in one channel is rarely ambiguous across three.

An AI layer that is actually useful. Beneath the dashboards sits a model layer trained on real production data, capable of distinguishing legitimate process variation from incipient defects. The user-facing intelligence includes a built-in assistant that lets quality engineers query their own production history in natural language — “show me every weld in the last 48 hours with a peak temperature drop above three sigma” — and get immediate answers without writing a single SQL query.

The combination matters. There are excellent thermal cameras on the market, and there are excellent machine-vision platforms. What Therness brings is the welding-specific integration between them — the part that customers consistently say they do not have the time, the data or the expertise to build themselves.

Validation on the shop floor

Two industrial sectors illustrate where HeatCore is already creating measurable value: automotive manufacturing and oil & gas.

In automotive, the challenge is volume combined with liability. A modern chassis or suspension line produces a weld every few seconds, and many of those joints sit on safety-critical components where a single missed defect can translate into a field failure, a recall or a warranty claim that dwarfs the cost of the part. Therness deploys HeatCore on robotic MIG welding stations producing safety-critical automotive components, monitoring every joint as it is produced, flagging anomalies in real time, and feeding weld-level quality data into the customer's MES. For the manufacturer, the payoff is twofold: defective parts are intercepted at the welding cell rather than at end-of-line inspection or, worse, after delivery; and every safety-critical weld leaves behind a structured, traceable record that supports both internal quality reviews and downstream documentation obligations toward the OEM.

In oil & gas, the challenge is consequence. Longitudinal seam welds on line pipe, structural welds on offshore equipment and process piping inside refineries are all assets where a single missed defect can mean shutdown, leak or worse. Conventional NDT — radiography, ultrasonics, MT, PT — remains indispensable, but it operates downstream of welding and tells you whether a weld is acceptable, not why it went wrong. HeatCore complements those methods by capturing the thermal signature of every weld as it is being made. The result is an upstream layer of evidence: an in-process record that flags suspect welds before they reach offline NDT, helps prioritise the inspection queue, and gives metallurgists a process-level explanation when a defect is later confirmed. On tube and pipe welding machines, HeatCore is integrated without modifying the OEM equipment's firmware or PLC logic, preserving the existing CE certification of the welding asset.

The two sectors share a pattern. The customer keeps their welding asset, their PLC and their existing NDT workflow. What changes is that every weld now carries a measured, traceable, queryable quality signature — and the conversation moves from inspecting parts to managing the process that produces them.

What makes Therness a Startup to Watch

The NDT and weld-quality space is not short of players. What sets Therness apart is the combination of four things that rarely come together in one supplier:

Academic depth, industrial pace.

The team is rooted in Politecnico di Torino research on welding physics, computational mechanics and computer vision, but the company operates as a product business with multi-site deployments, not as a consultancy.

A platform, not a black box.

HeatCore is modular. Customers can start with thermographic monitoring on a single station and grow into multi-sensor, multi-line deployments with the same data model and the same dashboards.

Built for retrofit.

Most welding equipment on the planet was installed before in-process monitoring was a serious requirement. Therness explicitly engineers for that installed base, instead of asking customers to wait for their next capex cycle.

Designed for traceability, not just inspection.

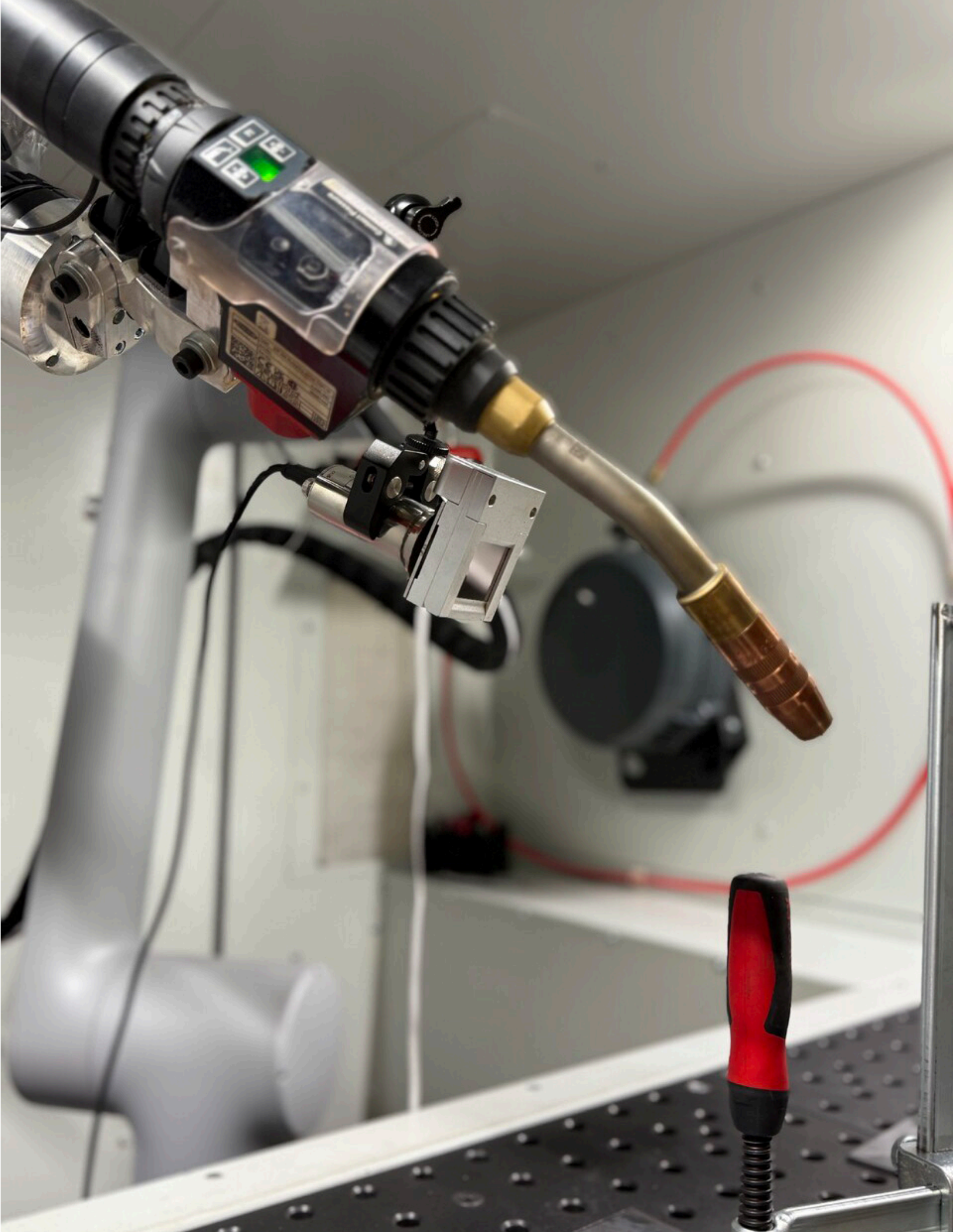
Every weld becomes a record. That record is what makes warranty defence, root-cause analysis and supplier qualification possible — and what positions HeatCore as an enabler of zero-defect manufacturing rather than yet another inspection silo.

Looking Ahead

Therness’ roadmap extends naturally into adjacent quality-control domains: post-weld optical inspection with low-cost laser profilometers, control-room platforms that aggregate quality data across an entire supplier base, and AI-assisted process tuning that closes the loop between monitoring and parameter selection. The common thread is the same as on day one: make in-process intelligence accessible, retrofit-friendly, and economically justifiable.

For NDT professionals, quality managers and welding engineers looking to move beyond after-the-fact inspection, Therness is a name worth tracking. The team welcomes discussions with system integrators, OEMs and end users — particularly in automotive, oil & gas, energy, and heavy industry — interested in piloting HeatCore on their own welding lines.

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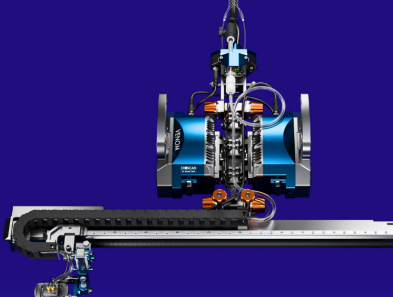


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