



INTESA SANPAOLO
INNOVATION CENTER

INDUSTRY TRENDS REPORT **NON-DESTRUCTIVE TESTING**



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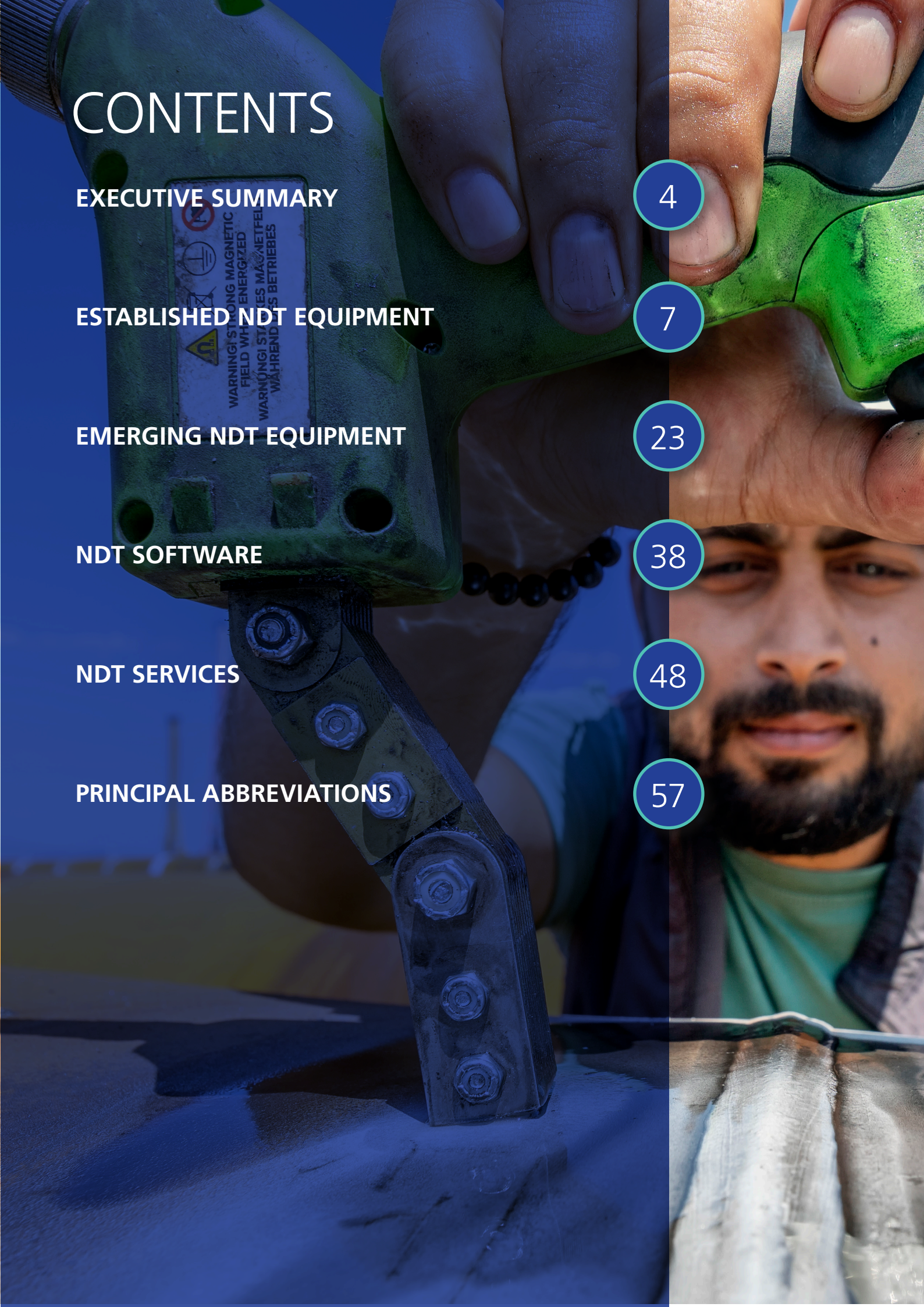
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EXECUTIVE SUMMARY

Non-destructive Testing (NDT) refers to a group of analysis techniques that are designed to inspect a material's properties without impacting its utility.

Overall, the global market for **established NDT equipment** is valued at \$3.1 billion (b) and is expanding at a Compound Annual Growth Rate (CAGR) of 5.8% to reach over \$4.3b in 2028. Uptake is driven by the need to test aging infrastructure in advanced economies, with the construction sector in general becoming a motor for growth, whilst uncertainty around the Oil & Gas (O&G) industry stemming from the Russia-Ukraine war has dampened demand in another major end-user group.

The most established non-destructive testing technologies primarily include **Radiography** and **Ultrasonic** Test (RT and UT) equipment.

The global **RT** market is valued at \$1.4b and is growing at 4.6% CAGR. Within this, Aerospace & Defence (A&D) applications are the largest at \$389m whilst Automotive & Transportation (A&T) are the fastest growing at 5.0%.

Lab RT dominates and is expected to continue to do so as digital solutions, which requires less exposure time, replace conventional radiology. **Field RT** is also growing strongly and is essential to performing quality inspections and safety checks across both process and discrete industries.

In the radiography segment, the market is **fragmented** with the top three players holding a combined 25%, led by Waygate Technologies (Germany).

The global **UT** market is valued at \$774m and is growing at 6.0% CAGR. Within this, A&D applications are the largest at \$172m whilst A&T are the fastest growing at 6.3%.

Portable UT is popular in power generation settings, allowing NDT technicians to collect, analyse and report data from on-site. **Automated UT**, which primarily comprises of immersion tanks, has gained approval for use in production or maintenance facilities.

In the ultrasonic segment, the market is concentrated with the top three players holding a combined 78%, led by Evident Corporation (United States).

Moving forwards, established NDT technologies have an opportunity to pivot to enabling energy storage and hydrogen fuel cell inspection whilst a range of **emerging NDT equipment** is catering to changing demands in terms of **what** is tested and **how**. This notably includes the growing need for monitoring composites and the increasing adoption of remote inspection technologies.

Emerging NDT equipment includes the **Total Focusing Method** (TFM) which involves concentrating ultrasonic waves in a phased manner at a region of interest. TFM makes scanning large areas faster and leverages high resolution to detect and characterise faults and defects. It is increasingly being integrated into robot-based NDT solutions.

Laser Shearography (LS) is an optics-based non-destructive testing technique which illuminates the object under test. LS is capable of detecting issues in complex materials by examining materials before and after the application of stress. It has an opportunity to expand its presence into field applications.

Terahertz NDT (THz NDT) uses electromagnetic waves which pass through a parabolic mirror to sample for thickness measurements. THz NDT has inherent advantages for inspecting non-conducting materials and an ability to provide sub-micron accuracy levels. It stands to benefit from Research & Development (R&D) into scanner components.

Infrared thermography (IR thermography) is an image-based non-destructive testing technique which captures and processes thermal radiation. IR thermography is cost-effective to produce, straightforward to deploy and offers a portable and contactless inspection methodology. It can be further improved by applying AI/ML coding.

Overall, it is anticipated that emerging NDT equipment will facilitate greater industrial sustainability through improvements in **hardware** efficiency and accuracy. It is however the adoption of **software** centric strategies that will change the game in this respect, boosting environmental credentials and adding client value.

Indeed, embracing software has the potential to address many of the current pain points in the NDT market and accelerate growth in the space. Traditionally, the industry has relied on equipment sales for revenue generation, but major players are alive to the opportunity that software offers. Overall, the global market for **NDT software** is valued at \$504 million (m) and is expanding at a CAGR of 12.0% to reach over \$854m in 2026.

The **integrated software** segment is the largest and since, by definition, solutions are sold alongside hardware, growth will follow that of equipment. As such, from a supply side perspective, the segment is dominated by incumbents. The **standalone software** segment, on the other hand, is the fastest growing with vendors offering user-friendly interfaces and multiple features and functionalities. Here, both Original Equipment Manufacturers (OEMs) and pure players are focused on delivering advanced data analysis.

In the future, emerging application areas such as additive manufacturing will represent a hotspot for NDT software. Similarly, solution providers have an opportunity to develop architecture which serves the “closed loop” production concept.

Despite the emergence of new equipment and the advent of software solutions, third party **NDT services** remain the cornerstone of the NDT industry. Overall, they generated revenues of \$8.9b globally in 2020 with this number expected to exceed \$10.4b in 2025, a CAGR of 3.2%.

The market is mature and continues to be supported by the implementation of safety regulations and the lack of skilled in-house employees across sectors whilst O&G is the key end-user vertical with up-, mid- and down-stream NDT applications. Beyond this, unlike in the equipment segments, the automotive sector plays second fiddle to the process, power and rail industries for many NDT services.

This report examines the commercial and technological dynamics which are shaping NDT globally. In particular, it explores the growing role that non-destructive testing is playing across a wide range of end-user segments and evaluates the evolving ways in which NDT equipment, software and services are being deployed for new and existing applications.





ESTABLISHED NDT EQUIPMENT

Non-destructive testing refers to a group of analysis techniques that are designed to inspect a material's properties without impacting its utility

Through Non-destructive Testing (NDT), owners and operators look to achieve Quality Control (QC) of materials, components, equipment, structures or systems in a cost-effective manner without affecting their performance or causing them any damage.

NDT is sometimes also referred to as Non-destructive Examination (NDEx), Non-destructive Inspection (NDI) and Non-destructive Evaluation (NDEv).

Overall, the global market for established NDT equipment is valued at \$2.9 billion (b) and is expanding at a CAGR of 5.8% to reach over \$4.3b in 2028

ESTABLISHED NDT EQUIPMENT, REVENUE FORECAST, GLOBAL, 2018–2028

CAGR, 2021–2028 = 5.8%



The background is a dark blue gradient with several glowing blue lines and dots, resembling a network or data visualization. The lines are curved and intersect, with small dots placed along them. The overall effect is a sense of dynamic movement and connectivity.

PRINCIPAL ABBREVIATIONS

A&D	<i>Aerospace & Defence</i>	MRO	<i>Maintenance, Repair & Overhaul</i>
A&T	<i>Automotive & Transportation</i>	NDEv	<i>Non-destructive Evaluation</i>
AI	<i>Artificial Intelligence</i>	NDEx	<i>Non-destructive Examination</i>
APAC	<i>Asia Pacific</i>	NDI	<i>Non-destructive Inspection</i>
B	<i>Billion</i>	NDT	<i>Non-destructive Testing</i>
BEV	<i>Battery Electric Vehicle</i>	NOC	<i>National Oil Company</i>
BIW	<i>Body in White</i>	O&G	<i>Oil & Gas</i>
CAGR	<i>Compound Annual Growth Rate</i>	OEM	<i>Original Equipment Manufacturer</i>
CapEx	<i>Capital Expenditure</i>	PAUT	<i>Phased-array UT Testing</i>
CMM	<i>Coordinate Measuring Machine</i>	PWI	<i>Plane Wave Imaging</i>
CT	<i>Computed Tomography</i>	QC	<i>Quality Control</i>
FMC	<i>Full Matrix Capture</i>	R&D	<i>Research & Development</i>
HVAC	<i>Heating Ventilation & Air Conditioning</i>	RoI	<i>Return on Investment</i>
IOC	<i>International Oil Company</i>	RT	<i>Radiography Test equipment</i>
IR	<i>Infrared</i>	RVI	<i>Remote Visual Inspection</i>
IRT	<i>Infrared Thermography</i>	SaaS	<i>Software as a Service</i>
LS	<i>Laser Shearography</i>	TFM	<i>Total Focusing Method</i>
LINAC	<i>Linear Accelerator</i>	THz	<i>Terahertz</i>
M	<i>Million</i>	THz NDT	<i>Terahertz Non-Destructive Testing</i>
ML	<i>Machine Learning</i>	UT	<i>Ultrasonic Test equipment</i>

ABOUT INTESA SANPAOLO INNOVATION CENTER:

Intesa Sanpaolo Innovation Center is the company of Intesa Sanpaolo Group dedicated to innovation: it explores and learns new business and research models and acts as a stimulus and engine for the new economy in Italy. The company invests in applied research projects and high potential start-ups, to foster the competitiveness of the Group and its customers and accelerate the development of the circular economy in Italy.

Based in the Turin skyscraper designed by Renzo Piano, with its national and international network of hubs and laboratories, the Innovation Center is an enabler of relations with other stakeholders of the innovation ecosystem - such as tech companies, start-ups, incubators, research centres and universities - and a promoter of new forms of entrepreneurship in accessing venture capital. Intesa Sanpaolo Innovation Center focuses mainly on circular economy, development of the most promising start-ups, venture capital investments of the management company Neva SGR and applied research

For further detail on Intesa Sanpaolo Innovation Center products and services, please contact

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