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AWARDS

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BEST PRACTICES AWARD

2020

WENZEL®

2020 GLOBAL
INDUSTRIAL COMPUTED TOMOGRAPHY (CT)
NEW PRODUCT INNOVATION AWARD

Contents

Background and Company Performance

Industry Challenges

Driven by global competition and the need to deliver high-quality products to the market faster, manufacturing companies are looking for superior product monitoring and validation solutions. Industrial CT is expected to become the most important technology for inspecting complex internal geometries and three-dimensional (3-D)-printed components. CT scanning tests products for tolerance assessments, part-to-part comparisons, thickness, and other measurements. It can access areas of components usually inaccessible to other metrology techniques, either in pre-assembly or assembled states. Frost & Sullivan notes that CT solutions are in a unique position to potentially and gradually replace coordinate measuring machines (CMM) for complex, small to medium parts manufactured. Major opportunities for the CT market are in the automotive sector, followed by aerospace and defense, electronics, and other emerging industry applications, including medical equipment, tool making, and plastics technology.

Frost & Sullivan analysts observe how CT solution providers are rising to the challenge as customer needs evolve. Despite the potential advantages of CT systems, Frost & Sullivan's ongoing research shows that a key technical challenge is balancing the high resolution, power, and scanning speed of offerings. The higher the resolution required, the higher is the number of pixels on the detector - and the longer is the scanning time. Moreover, scanning speeds hamper equipment adoption among manufacturers in the production environment. Speed is quite crucial in manufacturing. It will continue to play a vital role in pushing companies to adopt CT scanning systems in inline environments, integrating the technology into manufacturing processes. Conventional CT solutions involve the costly and time-consuming process of collecting large quantities of geometry measurements and the long process of data gathering and measurement cycle times. Existing nano-CT and micro/macro CT systems present a scan resolution of under 1 micron and less than 400 microns, respectively, while high-energy CT systems offer a scan resolution of over 400 microns.

Industry 4.0 causes further disruption to CT users, changing the way companies manufacture products and pushing the integration of measurement solutions into the production environment. As such, there is a rising need for flexible measuring systems capable of working in different environmental conditions. Frost & Sullivan anticipates further integration of intelligent and automation solutions, with full process control in the production and shop floor environments. The introduction of several proprietary CT solutions that can be loaded automatically with direct measurement activities is a key challenge. The industry needs CT solutions that combine a high degree of automation with accuracy, a significant prerequisite for production lines.

Moreover, the lack of standards that establish confidence in final CT results is holding end customers and industrial CT back from mainstream CT solutions' adoption among manufacturers. Several projects have size limitations, affecting magnification levels. Artifacts are a critical challenge, as CT solutions are based on simulated projections. The areas of an object can result in surface images becoming blurry. Properly understanding potential artifacts is necessary to provide high-quality service.

Frost & Sullivan concludes that CT solution providers capable of qualifying parts with less risk - while improving the qualification time - are best positioned to capture the growing revenue potential in industrial CT, as they can prevent losses due to failed manufactured parts.

New Product Attributes and Customer Impact

Founded in 1968 and based in Wiesthal, Germany, WENZEL Group GmbH & Co. KG (WENZEL) is a leading manufacturer of metrology solutions with over 10,000 installed machines worldwide. The company has decades of experience manufacturing and producing high-speed optical CMM and offers a comprehensive portfolio of innovative, compact, precise, value-adding CT products for the automotive, aerospace, power generation, and medical industries. WENZEL enjoys a prominent position in the global CT systems market, capitalizing on its extensive industrial exaCT series. Some of its key products include exaCT U in the upper-end class, exaCT M workstation, and exaCT S tabletop system. The company provides compact and desktop CT systems that are flexible and much smaller than other CT systems in the market. WENZEL's exaCT series covers a wide range of applications - including connectors, hearing aids, aluminum casting, combustion engines, , and remote controls.

Match to Needs: Offers Better X-ray Performance and Faster Detection

WENZEL launched its new advanced exaCT L solution in March 2020. exaCT L is one of the most compact CT solutions with its performance in the market. It has three independent axes, enabling high speed and short measuring times with a simple to use and effective workflow across the entire CT process.

Frost & Sullivan recognizes how the company delivers robust customer value on multiple fronts. Compared to many tactile or optical measuring machines that cannot carry out measurements at the component, the exaCT L can measure inside and outside objects with high precision. The exaCT L has superior X-ray performance combined with a fast detector, allowing it to measure objects and defects in a shorter period of time.

WENZEL has made significant inroads in the market with intuitive user guidance, which requires less training period and enables users to get results after a short time. This is due to the intelligent software in exaCT L that optimizes all measuring parameters automatically, delivering robust customer value.

Customer Purchase and Ownership Experience: Provides a Superior and Modular System

Compared to several existing solutions, WENZEL's exaCT series, including exaCT L, can support metrology and non-destructive testing applications. The company provides an offering with one measurement that covers multiple evaluations to save time, including scanning numerous cavities. The exaCT L comes in 2 versions, one with 150kV and another with 225kV. WENZEL equips the 150kV version with a high-resolution microfocus X-ray source with a 6,000-pixel detector. Establishing a new benchmark with one of the highest-powered X-ray sources available in the 225 kV version, exaCT L offers up to 1,600 watts with higher flexibility in applications for larger measuring volumes, i.e., 235mm in diameter

and 300mm in height.

Frost & Sullivan notes that another added benefit that provides a superior purchase experience is its configurable and modular system for individual requirements. Unlike many of its other competitors, the company can customize its system to provide a solution based on user requirements. Instead of comprising applications that a general manufacturer offers in the market, the exaCT L is quite flexible. It provides options to configure existing CT system power sources and detectors, depending on the application requirement. With a 225kV output, exaCT L only takes 3 minutes to scan high-density materials, including plastics. WENZEL's products support higher densities materials made of plastic, metal, or multi-materials. There is no general restriction on materials that can be scanned.

Moreover, WENZEL's exaCT series has a low cost of ownership and maintenance of X-ray technology - as well as a long lifetime and calibration intervals, averaging just one year for exaCT L.

Reliability: Anticipates Customer Needs through Forward Thinking

WENZEL is reshaping the industrial CT market by developing its hardware with high standards and reliability. With superior scanning capabilities covering large components, volumes, and high densities, the development of exaCT L has made measurement CT solutions more reliable and applicable to the operations of OEMs. Frost & Sullivan analysts monitor how this dynamic is driving the company's growth and acceptance in the market. Its ability to measure a wide range of materials, including composites, plastics, and light metal materials, as well as different material densities, ensures higher reliability.

By properly understanding the importance of providing higher reliability, WENZEL provides measurement results with fast scanning, reconstruction, and assessment across all CT process stages. exaCT L also offers the most compact solutions in its class of 225kV output in response to the small space requirements of customers.

Price/Performance Value: Offers a More Affordable Option

Frost & Sullivan finds that WENZEL's products offer high quality at an affordable price compared with other offerings in the market. WENZEL scores highly on price-performance value based on exaCT L, which is 10%–15% more affordable than other competitive offerings in its class. exaCT L has a price range between USD300,000–USD430,000, depending on resolution and power requirements. The package includes the evaluation software and calibration after one year. With no hidden costs and predictable and transparent price packages, WENZEL is becoming well accepted in the industrial CT market.

OEMs appreciate the price-performance value offered by WENZEL's exaCT systems, which reduce maintenance and ownership costs while improving inspection quality and productivity for high-throughput industrial applications. exaCT series' high price-performance value has led to WENZEL gaining increasing acceptance in applications and industries such as automotive, aerospace and defense, medical equipment, plastic processing, electronics, and tool making. exaCT L has recently gained traction in the usage of CT machines in the household industry.

Quality: Meets Shop Floor Requirements with Compact Systems and Superior Power Potential

WENZEL has been quite successful in introducing compact, customizable systems with superior power potential and advanced resolution, ideal for integration into the shop floor and usage in a research environment. Its exaCT series are in a unique market position to provide high-precision and -speed, large volume coverage, and non-destructive metrology, enabling fast and easy interpretation of CT results to predict failures. This capacity generates exciting growth opportunities in supporting the demands of Industry 4.0.

There is a growing integration of measurement solutions into the production environment as a quality control requirement. WENZEL has introduced shop floor measuring systems and automated integration of its hardware into the production environment in response. The exaCT L is an ideal solution to meet the increasing shop floor requirements. It features a high power X-ray source in combination with a robust and fast detector for short scans, ideal for placement in the industrial production environment.

There is a rising need for flexible measuring systems capable of operating in different environmental conditions. WENZEL has introduced a broad range of capabilities, including the ability to decrease the influence of dirt and temperature (irrespective of the environmental conditions). This ensures the highest quality CT measuring of results in response to a wide range of user requirements.

Conclusion

WENZEL has positioned itself as one of the leading companies in the industrial CT market year-over-year. The company continues to gain popularity in multiple industries, including automotive, aerospace and defense, medical equipment, and tool making. With its latest exaCT L, it is offering one of the most compact, high-value, and cost-effective offerings available in the market today in the 225kV and 1,600 watts performance class. Frost & Sullivan analysts conclude that WENZEL's exaCT L provides a strong value proposition with a completely automated workflow for each stage across the entire CT process, driving its growth. Future growth opportunities are based the introduction of CT solutions that improve the components' inspection time due to its fast detector and superior X-ray performance.

For its industry-leading product innovation and robust overall performance, WENZEL has earned the 2020 Frost & Sullivan Global New Product Innovation Award.

Significance of New Product Innovation

Ultimately, growth in any organization depends on continually introducing new products to the market and successfully commercializing those products. For these dual goals to occur, a company must be best in class in three key areas: understanding demand, nurturing the brand, and differentiating from the competition.

Understanding New Product Innovation

Innovation is about finding a productive outlet for creativity, for consistently translating ideas into high-quality products that have a profound impact on the customer.

Key Benchmarking Criteria

For the Global New Product Innovation Award, Frost & Sullivan analysts independently evaluated 2 key factors, New Product Attributes and Customer Impact, according to the criteria identified below.

New Product Attributes
Criterion 1: Match to Needs
Criterion 2: Reliability
Criterion 3: Quality
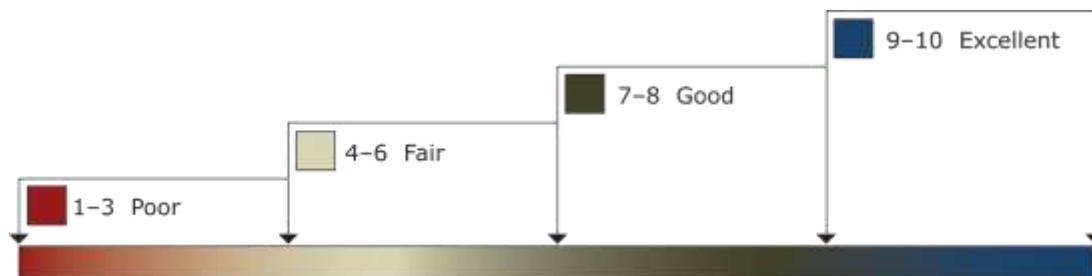Criterion 4: Positioning
Criterion 5: Design

Customer Impact
Criterion 1: Price/Performance Value
Criterion 2: Customer Purchase Experience
Criterion 3: Customer Ownership Experience
Criterion 4: Customer Service Experience
Criterion 5: Brand Equity

Best Practices Award Analysis for WENZEL

Decision Support Scorecard

To support its evaluation of best practices across multiple business performance categories, Frost & Sullivan employs a customized Decision Support Scorecard. This tool allows research and consulting teams to objectively analyze performance according to the key benchmarking criteria listed in the previous section, and to assign ratings on that basis. The tool follows a 10-point scale that allows for nuances in performance evaluation. Ratings guidelines are illustrated below.

RATINGS GUIDELINES

9–10 Excellent
7–8 Good
4–6 Fair
1–3 Poor

The Decision Support Scorecard considers Customer Impact and Business Impact (i.e., the overarching categories for all 10 benchmarking criteria; the definitions for each criterion are provided beneath the scorecard). The research team confirms the veracity of this weighted scorecard through sensitivity analysis, which confirms that small changes to the ratings for a specific criterion do not lead to a significant change in the overall relative rankings of the companies.

The results of this analysis are shown below. To remain unbiased and to protect the interests of all organizations reviewed, Frost & Sullivan has chosen to refer to the other key participants as Competitor 2 and Competitor 3.

Measurement of 1–10 (1 = poor; 10 = excellent)			
New Product Innovation	New Product Attributes	Customer Impact	**Average Rating**
WENZEL	**8.9**	**8.8**	**8.9**
Competitor 2	8.5	8.3	8.4
Competitor 3	8.2	8.2	8.2

New Product Attributes

Criterion 1: Match to Needs
Requirement: Customer needs directly influence and inspire the product's design and positioning.

Criterion 2: Reliability
Requirement: The product consistently meets or exceeds customer expectations for consistent performance during its entire life cycle.

Criterion 3: Quality
Requirement: Product offers best-in-class quality, with a full complement of features and functionalities.

Criterion 4: Positioning
Requirement: The product serves a unique, unmet need that competitors cannot easily replicate.

Criterion 5: Design
Requirement: The product features an innovative design, enhancing both visual appeal and ease of use.

Customer Impact

Criterion 1: Price/Performance Value
Requirement: Products or services offer the best value for the price, compared to similar offerings in the market.

Criterion 2: Customer Purchase Experience
Requirement: Customers feel they are buying the optimal solution that addresses both their unique needs and their unique constraints.

Criterion 3: Customer Ownership Experience

Requirement: Customers are proud to own the company's product or service and have a positive experience throughout the life of the product or service.

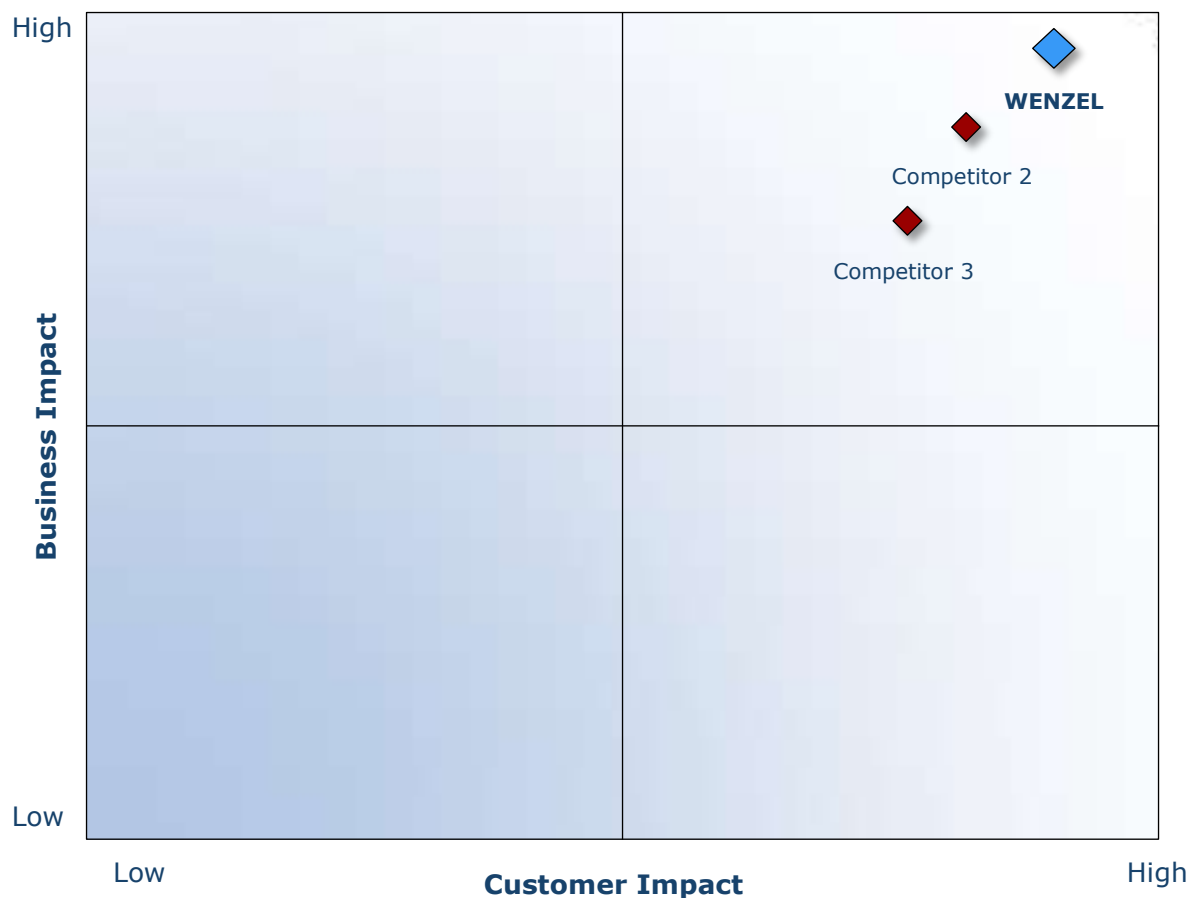### Criterion 4: Customer Service Experience

Requirement: Customer service is accessible, fast, stress-free, and of high quality.

Criterion 5: Brand Equity

Requirement: Customers have a positive view of the brand and exhibit high brand loyalty.

Decision Support Matrix

Once all companies have been evaluated according to the Decision Support Scorecard, analysts then position the candidates on the matrix shown below, enabling them to visualize which companies are truly breakthrough and which ones are not yet operating at best-in-class levels.

Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan analysts follow a 10-step process to evaluate Award candidates and assess their fit with select best practices criteria. The reputation and integrity of the Awards are based on close adherence to this process.

STEP		OBJECTIVE	KEY ACTIVITIES	OUTPUT
1	Monitor, target, and screen	Identify Award recipient candidates from around the world	• Conduct in-depth industry research • Identify emerging industries • Scan multiple regions	Pipeline of candidates that potentially meet all best practices criteria
2	Perform 360-degree research	Perform comprehensive, 360-degree research on all candidates in the pipeline	• Interview thought leaders and industry practitioners • Assess candidates' fit with best practices criteria • Rank all candidates	Matrix positioning of all candidates' performance relative to one another
3	Invite thought leadership in best practices	Perform in-depth examination of all candidates	• Confirm best practices criteria • Examine eligibility of all candidates • Identify any information gaps	Detailed profiles of all ranked candidates
4	Initiate research director review	Conduct an unbiased evaluation of all candidate profiles	• Brainstorm ranking options • Invite multiple perspectives on candidates' performance • Update candidate profiles	Final prioritization of all eligible candidates and companion best practices positioning paper
5	Assemble panel of industry experts	Present findings to an expert panel of industry thought leaders	• Share findings • Strengthen cases for candidate eligibility • Prioritize candidates	Refined list of prioritized Award candidates
6	Conduct global industry review	Build consensus on Award candidates' eligibility	• Hold global team meeting to review all candidates • Pressure-test fit with criteria • Confirm inclusion of all eligible candidates	Final list of eligible Award candidates, representing success stories worldwide
7	Perform quality check	Develop official Award consideration materials	• Perform final performance benchmarking activities • Write nominations • Perform quality review	High-quality, accurate, and creative presentation of nominees' successes
8	Reconnect with panel of industry experts	Finalize the selection of the best practices Award recipient	• Review analysis with panel • Build consensus • Select recipient	Decision on which company performs best against all best practices criteria
9	Communicate recognition	Inform Award recipient of recognition	• Announce Award to the CEO • Inspire the organization for continued success • Celebrate the recipient's performance	Announcement of Award and plan for how recipient can use the Award to enhance the brand
10	Take strategic action	Upon licensing, company is able to share Award news with stakeholders and customers	• Coordinate media outreach • Design a marketing plan • Assess Award's role in strategic planning	Widespread awareness of recipient's Award status among investors, media personnel, and employees

The Intersection between 360-Degree Research and Best Practices Awards

Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of the research process. It offers a 360-degree view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often companies make important growth decisions based on a narrow understanding of their environment, resulting in errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry participants and for identifying those performing at best-in-class levels.

360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS

About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, helps clients accelerate growth and achieve best-in-class positions in growth, innovation, and leadership. The company's Growth Partnership Service provides the CEO and the CEO's growth team with disciplined research and best practices models to drive the generation, evaluation, and implementation of powerful growth strategies. Frost & Sullivan leverages nearly 60 years of experience in partnering with Global 1000 companies, emerging businesses, and the investment community from 45 offices on 6 continents. To join Frost & Sullivan's Growth Partnership, visit http://www.frost.com.