



XACT Robotics® Recognized for

2021

Technology Innovation Leadership

North American Percutaneous
Procedure System Industry

Excellence in Best Practices

Best Practices Criteria for World-Class Performance

Frost & Sullivan applies a rigorous analytical process to evaluate multiple nominees for each Award category before determining the final Award recipient. The process involves a detailed evaluation of best practices criteria across two dimensions for each nominated company. XACT Robotics excels in many of the criteria in the percutaneous procedure system space.

AWARD CRITERIA	
<i>Technology Leverage</i>	<i>Business Impact</i>
Commitment to Innovation	Financial Performance
Commitment to Creativity	Customer Acquisition
Stage Gate Efficiency	Operational Efficiency
Commercialization Success	Growth Potential
Application Diversity	Human Capital

Breakthrough Hands-Free Robotic System, to combine precise robotic insertion and non-linear steering with advanced image based planning and real time monitoring for Use in CT-Guided Percutaneous Procedures with Accuracy, Consistency, and Efficiency

There is a growing demand worldwide for percutaneous procedures including ablation, fluid drainage, biopsy, and so on. These procedures are less invasive than conventional surgeries, resulting in shorter

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- Neeraj Nitin Jadhav, Senior Research Analyst

recovery times and improved health outcomes for patients. However, the traditional manual methods for performing percutaneous procedures often require multiple insertions and repositioning of the medical instruments to reach the target site in the patient’s body, leading to erratic procedure times - ranging from 20 minutes to a few hours. The cumbersome nature of these manual methods puts tremendous physical strain on interventional radiologists and the support staff and leads to occupational hazards, including malignancy

development in procedures with radiation exposure. While image-guided percutaneous intervention systems address some of the manual methods’ limitations, they do not overcome the main challenges of operating in the soft tissue environment with a combination of patient, tissue and target movements, and

usually are large and require a dedicated space within the hospital. This hinders the ability to reach the required targets, the efficiency of the clinical workflow and restricts the platforms' application in different sites of service.

Headquartered in Caesarea, Israel, with offices in Hingham MA, XACT Robotics® has developed a first-of-its-kind robotic system to address the limitations of manual methods and other image-guided percutaneous intervention systems. The XACT ACE® Robotic System combines precise robotic insertion and non-linear steering with advanced image based planning and real time monitoring to deliver various instruments to selected targets during computed tomography (CT)-guided percutaneous procedures. The FDA 510(k)-cleared XACT ACE® Robotic System consists of a console and a tablet-sized robot. Interventional radiologists use the console to assess real time CT images of the patient and plan the procedure, including selecting the target, entry and if needed check-points, as well as monitoring the instruments' advancement. Once the procedure's trajectory is confirmed, the robot is placed on the patient's body, and the robot itself inserts the instruments and steers them to the target site using its five degrees of freedom.

Advanced proprietary algorithms provide the XACT ACE® Robotic System remarkable non-linear steering capabilities to accurately reach the specified anatomical target inside the body or in hard-to-reach areas. Even if the target's location changes due to the patient's movement or breathing, the system can compensate for these changes without the need for any manual instrument adjustments, which results in unparalleled accuracy of less than 1.7mm average tip to target which allows for earlier interventions, reaching smaller targets, and reducing watchful waiting. It reaches the site quickly (the average skin to target time is less than 8.5 minutes) and usually in only one insertion to target. Frost & Sullivan notes that this eliminates the need for frequent instrument reinsertions, leading to more predictable and consistent procedure times, and promoting overall procedure efficiency. It also reduces physical strain and minimizes radiation exposure and associated health risks for interventional radiologists or any other provider. The system's ability to deliver instruments to the target site in a precise timeframe and on the first attempt allows physicians to plan the operative suite time better. Frost & Sullivan appreciates how this improves staff utilization and facility resources, increasing hospitals' profitability and revenues. Most importantly, its use results in fewer complications and shorter recovery times for patients and to intervene sooner potentially enables earlier diagnosis and treatment of life-threatening conditions.

Frost & Sullivan's independent research suggests that the XACT ACE® Robotic System's ability to democratize interventional procedures is a critical differentiator in the market. Since interventional radiologists plan the procedure and monitor the procedure (intellectual skills), while the robotic platform inserts and steers the medical instruments while accommodating for anatomical variations (technical skills), this removes variability in clinical care and improves patient health outcomes. Furthermore, since the system manages the technical aspects of instrument insertion and steering, even other health professionals, including physician assistants and nurse practitioners, can perform the procedures (regardless of their experience level) which maximize efficiencies.

Frost & Sullivan's analysts point out that another factor that clearly sets the XACT ACE® Robotic System apart from the competition is its small footprint and mobility. The platform can be efficiently set up for use within minutes and does not require a dedicated specialized space, preventing clinical workflow disruption. The system's compactness allows simple transportation across multiple procedure rooms and

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locations outside the CT suite. Operators can use it during different types of percutaneous interventions, including ablation; site-specific drug delivery; biopsies; and drainage in CT guided percutaneous procedures. While the current FDA 510(k) clearance is restricted to CT-guided procedures, the company designed the system to work with multiple imaging modalities -

including ultrasound, magnetic resonance imaging (MRI), cone-beam CT, and fluoroscopy.

Robust Clinical Validation to Spur Promising Growth

Over 200 clinical and preclinical procedures have validated the XACT ACE™ Robotic System extensively for its safety, as well as its efficacy by demonstrating an average accuracy of <1.7mm (Tip to Target).

Promising results from various clinical studies and the XACT ACE® Robotic System's utility drive the platform's adoption among prominent hospitals and radiology centers of excellence in the United States, ranging from teaching health systems to private practice locations; including Lahey Hospital & Medical Center in Massachusetts and Sarasota Interventional Radiology of Florida. XACT Robotics actively works with interventional radiologists and other healthcare practitioners to boost the system's adoption further. The company also launched the #XACTlyonTarget promotional campaign on social media to highlight the platform's immense benefits.

The XACT ACE® Robotic System's intuitive design, which makes it quite simple to learn and adopt, drives its growth. Frost & Sullivan notes that other competing products require interventional radiologists to extensively train on them over numerous clinical procedures to get accustomed to the system, and still rely on their manual skills to reach the targets. On the other hand, the XACT ACE® Robotic System's learning curve can be as low as five procedures for health professionals to achieve full training.

XACT Robotics also added remote control capabilities to its system, the ACE Xtend™, to enable providers to operate it from the CT control room, minimizing their exposure to Hospital Acquired Infections (including SARS-CoV-2) and thus the risk of disease transmission from and to patients during procedures. The advantages that the system offers to patients and interventional radiologists have attracted the attention of prominent investors in the surgical robotics space, including Chasing Value Asset Management Inc. and MEDX Ventures Group. This robust investor support will likely provide XACT Robotics with a strong impetus to further commercialize the system among hospitals and radiology centers of excellence in the United States and globally.

Conclusion

Percutaneous procedures' clinical benefits drive their adoption globally. However, manual methods used to perform percutaneous procedures can require multiple instrument insertions and lead to unpredictable procedure times, unnecessary radiation exposure, physical strain, and occupational illness among interventional radiologists. Meanwhile, the use of large image-guided systems can impact clinical workflows while still relying on the manual skills of the user..

Frost & Sullivan recognizes how XACT Robotics has developed a groundbreaking hands-free robotic system to properly overcome these barriers. The system combines precise robotic insertion and non-linear steering with advanced image-based planning and real time monitoring to reach target anatomical sites during CT-guided percutaneous procedures with high accuracy and safety, and within a predictable time frame. Besides enhancing physicians' efficiency in the delivery of care, the platform improves hospital resource utilization and, subsequently, their profitability and revenues. Its small footprint eliminates the need for specialized space, prevents workflow disruptions, and facilitates ease of use across multiple clinical sites. The XACT ACE® Robotic System's compatibility with different medical instruments enables use across a broad application spectrum. Frost & Sullivan lauds the company's ability to develop a platform that stays true to its mission of democratizing percutaneous procedures, reducing reliance on physicians' technical skill at wielding instruments, and addressing clinical variability.

With its strong overall performance, XACT Robotics earns the 2021 Frost & Sullivan Technology Innovation Leadership Award in the percutaneous procedure system industry.

What You Need to Know about the Technology Innovation Leadership Recognition

Frost & Sullivan's Technology Innovation Leadership Award recognizes the company that has introduced the best underlying technology for achieving remarkable product and customer success while driving future business value.

Best Practices Award Analysis

For the Technology Innovation Leadership Award, Frost & Sullivan analysts independently evaluated the criteria listed below.

Technology Leverage

Commitment to Innovation: Continuous emerging technology adoption and creation enables new product development and enhances product performance

Commitment to Creativity: Company leverages technology advancements to push the limits of form and function in the pursuit of white space innovation

Stage Gate Efficiency: Technology adoption enhances the stage gate process for launching new products and solutions

Commercialization Success: Company displays a proven track record of taking new technologies to market with a high success rate

Application Diversity: Company develops and/or integrates technology that serves multiple applications and multiple environments

Business Impact

Financial Performance: Strong overall financial performance is achieved in terms of revenues, revenue growth, operating margin, and other key financial metrics

Customer Acquisition: Customer-facing processes support efficient and consistent new customer acquisition while enhancing customer retention

Operational Efficiency: Company staff performs assigned tasks productively, quickly, and to a high-quality standard

Growth Potential: Growth is fostered by a strong customer focus that strengthens the brand and reinforces customer loyalty

Human Capital: Commitment to quality and to customers characterize the company culture, which in turn enhances employee morale and retention

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Key Impacts:

- **Growth Pipeline:** Continuous Flow of Growth Opportunities
- **Growth Strategies:** Proven Best Practices
- **Innovation Culture:** Optimized Customer Experience
- **ROI & Margin:** Implementation Excellence
- **Transformational Growth:** Industry Leadership



The Innovation Generator™

Our 6 analytical perspectives are crucial in capturing the broadest range of innovative growth opportunities, most of which occur at the points of these perspectives.

Analytical Perspectives:

- **Mega Trend (MT)**
- **Business Model (BM)**
- **Technology (TE)**
- **Industries (IN)**
- **Customer (CU)**
- **Geographies (GE)**

