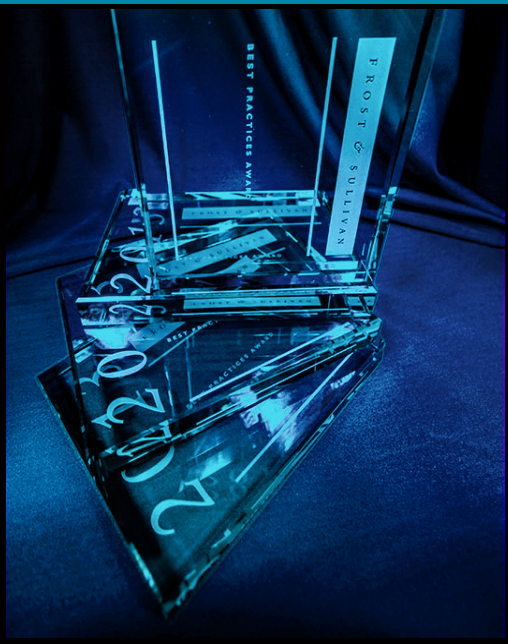


F R O S T & S U L L I V A N

# Carestream

## 2016 North American Computerized Tomography for Extremity Imaging New Product Innovation Award



FROST & SULLIVAN

BEST  
2016 PRACTICES  
AWARD

NORTH AMERICAN COMPUTERIZED  
TOMOGRAPHY FOR EXTREMITY IMAGING  
NEW PRODUCT INNOVATION AWARD

2016  
BEST PRACTICES  
AWARDS

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## Background and Company Performance

### *Industry Challenges*

Conventional radiography and multi-detector computerized tomography (MDCT) have been the preferred imaging modality for diagnosing bone injuries in extremities. However, these imaging modalities often provide inconclusive results due to the complexity of the human body and a number of biomechanical derangements that occur in weight-bearing conditions. MDCT has traditionally been a non-weight bearing imaging modality and, thus, is unable to detect biomechanical derangements such as the presence of flatfoot.

Clinical studies with cone beam computerized tomography (CBCT) systems have suggested that numerous shortcomings exist in the current MDCT systems regarding the diagnosis of common biomechanical abnormalities. Examinations of lower extremity pathologies have suggested that MDCT provides indecisive and ambiguous results which can lead to the misdiagnosis of chronic knee, foot, and ankle injuries.

Moreover, the structure of conventional MDCT systems is such that it provides extensive radiation exposure to the entire body rather than exposing only the desired body part. Unnecessary radiation exposure has been deemed harmful, especially in cases where the patient is expected to undergo repeat examinations. Furthermore, the installation of MDCT systems is expensive, involves complex site considerations at new healthcare settings, and is devoid of point-of-care (POC) access.

Carestream Health (Carestream), a global manufacturer of medical imaging systems, recently received clearance from the US Food and Drug Administration (FDA) to launch its CBCT device, the OnSight 3D Extremity System, in the United States. The system has been developed with relative advantages in dose reduction and weight-bearing compared to conventional MDCT systems.

### *New Product Attributes and Customer Impact*

#### ***Design***

Carestream's OnSight 3D Extremity System offers an ergonomic design with matchless features that empower healthcare professionals and patients alike. The device is a game-changer in cone beam CT solutions as it offers an intuitive design that is distinct from the conventional doughnut shaped CT scanners. The system consists of a wide door opening that provides easy, step-in patient access for weight-bearing examinations. The larger than usual imaging bore accommodates heavier patients while enabling a wide field-of-view image capture. To optimize the workflow of the technologist, a dual-side positioning joystick allows convenient equipment-positioning adjustments. On the top of the device, two patient-support handles provide safety and comfort. These handles can be moved upwards if they are not required during an examination. An LED light indicator is placed above these patient-support handles and show the status of X-ray exposure. Finally, a monitor attached

to the system displays the patient's necessary demographic details and the imaging status. This allows flexible adjustments for individualized diagnoses of extremities, allowing a faster, convenient, and comfortable experience during weight-bearing examinations.

### ***Match to Needs***

Compared to traditional CT imaging that uses a fan beam of X-rays and multiple rotations to image a patient, cone beam CT scans an extended volume of the patient in a single rotation using a large-area detector. CBCT offers a simplified system design without the need for high-speed slip ring technology as with conventional CT scanners. With Carestream's OnSight 3D Extremity System, the continued optimization of interactive-based reconstruction techniques further improves image quality compared to conventional CT. However, weight-bearing applications and instances of biomechanical derangements, in particular, are better evaluated using the OnSight 3D Extremity System which can help evaluate any underlying anatomical abnormality. By delivering volumetric reconstruction that has isotropic spatial resolution in all three directions, the system perfectly matches market and customer needs, and bridges the gap that has traditionally existed with multi-detector CT systems.

### ***Quality***

Being a global leader in diagnostic imaging, Carestream designed the OnSight 3D Extremity System to provide pristine 3-D images of high diagnostic value at the point-of-care. Through these high-resolution 3-D images, subtle or occult fractures can be evaluated in weight-bearing studies and fracture healing can be assessed. The device can improve the visibility of patient anatomy even in the presence of metal implants, which are a common cause of noise in CT images.

The system improves workflow and productivity due to its ability to perform both 2-D and 3-D scans on the same device. A large touch-screen monitor and dual controls on either side of the system allow technologists to work more efficiently. The device expedites patient scan times as it offers a fast equipment setup option with pre-programmed auto-positions. Due to its ergonomic design, it offers a small footprint and saves considerably on time and installation costs. Moreover, it reduces the need for a high-cost shielded room which automatically reduces both capital costs and maintenance expenses. These remarkable features testify to Carestream's focus on product quality; hence, the company is expected to gain a major competitive advantage in the CT segment.

### ***Positioning***

One of the key unique value propositions offered by the OnSight 3D Extremity System is its ability to reduce patients' exposure to radiation during clinical examinations. Exposure to ionizing radiation is a prevalent issue with CT systems because the patient's whole body receives unwanted radiation. Unlike conventional scanners, the OnSight 3D Extremity System targets only the desired body part and reduces radiation exposure.

### ***Customer Service Experience***

Carestream places special emphasis on providing an exceptional service experience to all of its existing and new customers. Globally, the company has a team dedicated to technical and professional services that ensure all of its equipment continues to run at their peak performance. For the OnSight 3D Extremity System, the company has a dedicated team that provides technical assistance to medical professionals in hospitals and private clinics after the machine has been acquired. Through a dedicated Customer Success Network, clients have access to a global team of experts that take immediate action and personally resolve service requests. eXceed, a corporate initiative from Carestream, is intended to create a customer-centric culture and collects data on customers' individual experience and analyzes the data to identify and improve any limitations that hinder the performance of a hospital.

### ***Brand Equity***

Carestream is a global provider of medical and dental imaging systems, providing solutions for clinical imaging, dental practices, imaging centers, oncology, orthopedics, otolaryngology, pediatrics, veterinary medicine, and women's healthcare, to name a few. The company is considered a frontrunner in medical imaging and healthcare IT, dental imaging, and non-destructive testing. The company operates in over 170 countries and has close to 800 patents under its name for medical and dental imaging and information technology. The company's focus on building its brand name in untapped markets, such as developing regions of Asia, Africa, and Latin America, has improved its revenue and profit margins year-over-year. The company places a high priority on exceeding customers' expectations and fulfilling the needs of its potential customers in every way possible.

### ***Conclusion***

Cone beam CT systems present a high-value promise to healthcare organizations around the world as these systems employ high-quality three-dimensional imaging to deliver Point-of-Care access to healthcare professionals. The combination of a small, yet striking and prominent design, weight-bearing imaging, improved productivity, and state-of-the-art image reconstruction is expected to ensure that the OnSight 3D Extremity System enjoys global success. With its strong overall performance, Carestream Health has earned Frost & Sullivan's 2016 New Product Innovation Award.

## Significance of New Product Innovation

Ultimately, growth in any organization depends upon 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 New Product Innovation Award, Frost & Sullivan analysts independently evaluated two 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

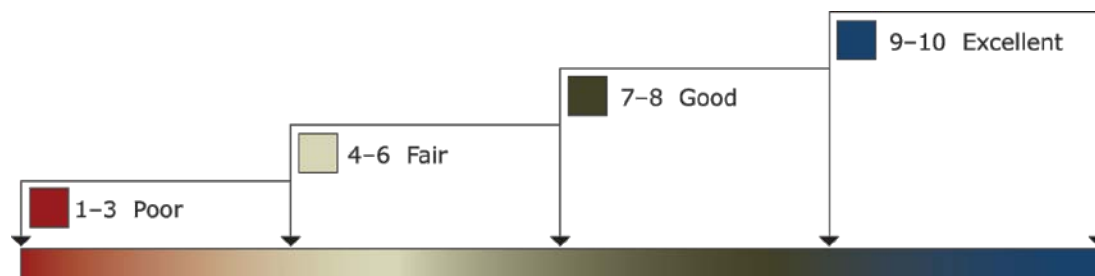
- Criterion 1: Price/Performance Value
- Criterion 2: Customer Purchase Experience
- Criterion 3: Customer Ownership Experience
- Criterion 4: Customer Service Experience
- Criterion 5: Brand Equity

## Best Practice Award Analysis for Carestream Health

### 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 our 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



The Decision Support Scorecard is organized by New Product Attributes and Customer Impact (i.e., the overarching categories for all 10 benchmarking criteria; the definitions for each criteria 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, we have chosen to refer to the other key players as Competitor 2 and Competitor 3.

#### DECISION SUPPORT SCORECARD FOR NEW PRODUCT INNOVATION AWARD

<i>Measurement of 1–10 (1 = poor; 10 = excellent)</i>			
<b>New Product Innovation</b>	New Product Attributes	Customer Impact	Average Rating
<b>Carestream Health</b>	<b>9.5</b>	<b>9.5</b>	<b>9.5</b>
Competitor 2	8	8	8
Competitor 3	8	7.5	7.75

### *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 functionality

#### **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 like they are buying the most 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**

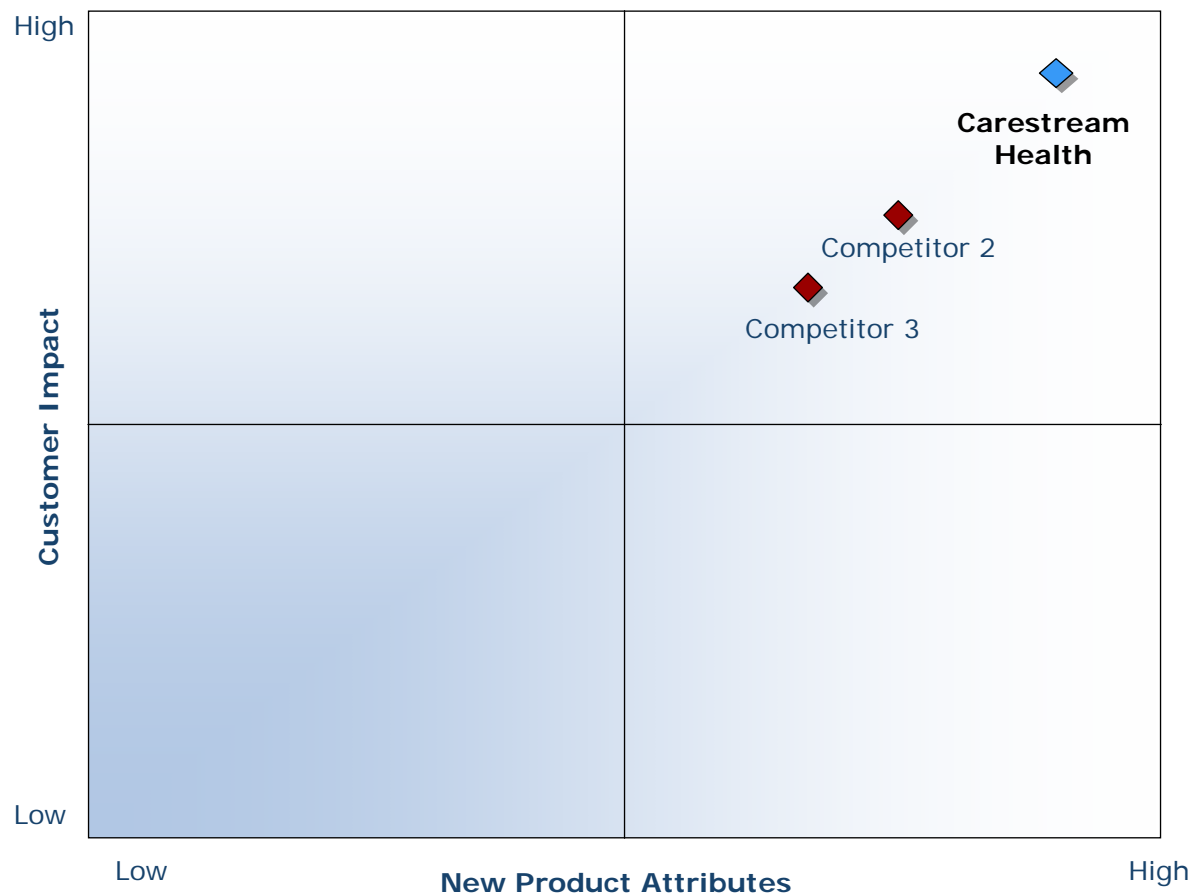
Requirement: Customer service is accessible, fast, stress-free, and of high quality

**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 can 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.

**DECISION SUPPORT MATRIX FOR NEW PRODUCT INNOVATION AWARD**

## The Intersection between 360-Degree Research and Best Practices Awards

### *Research Methodology*

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of our research process. It offers a 360-degree-view of industry challenges, trends, and issues by integrating all seven of Frost & Sullivan's research methodologies. Too often, companies make important growth decisions based on a narrow understanding of their environment, leading to 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 players and for identifying those performing at best-in-class levels.

### 360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS



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

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

STEP	OBJECTIVE	KEY ACTIVITIES	OUTPUT
1 <b>Monitor, target, and screen</b>	Identify award recipient candidates from around the globe	<ul style="list-style-type: none"> <li>• Conduct in-depth industry research</li> <li>• Identify emerging sectors</li> <li>• Scan multiple geographies</li> </ul>	Pipeline of candidates who potentially meet all best-practice criteria
2 <b>Perform 360-degree research</b>	Perform comprehensive, 360-degree research on all candidates in the pipeline	<ul style="list-style-type: none"> <li>• Interview thought leaders and industry practitioners</li> <li>• Assess candidates' fit with best-practice criteria</li> <li>• Rank all candidates</li> </ul>	Matrix positioning all candidates' performance relative to one another
3 <b>Invite thought leadership in best practices</b>	Perform in-depth examination of all candidates	<ul style="list-style-type: none"> <li>• Confirm best-practice criteria</li> <li>• Examine eligibility of all candidates</li> <li>• Identify any information gaps</li> </ul>	Detailed profiles of all ranked candidates
4 <b>Initiate research director review</b>	Conduct an unbiased evaluation of all candidate profiles	<ul style="list-style-type: none"> <li>• Brainstorm ranking options</li> <li>• Invite multiple perspectives on candidates' performance</li> <li>• Update candidate profiles</li> </ul>	Final prioritization of all eligible candidates and companion best-practice positioning paper
5 <b>Assemble panel of industry experts</b>	Present findings to an expert panel of industry thought leaders	<ul style="list-style-type: none"> <li>• Share findings</li> <li>• Strengthen cases for candidate eligibility</li> <li>• Prioritize candidates</li> </ul>	Refined list of prioritized award candidates
6 <b>Conduct global industry review</b>	Build consensus on award candidates' eligibility	<ul style="list-style-type: none"> <li>• Hold global team meeting to review all candidates</li> <li>• Pressure-test fit with criteria</li> <li>• Confirm inclusion of all eligible candidates</li> </ul>	Final list of eligible award candidates, representing success stories worldwide
7 <b>Perform quality check</b>	Develop official award consideration materials	<ul style="list-style-type: none"> <li>• Perform final performance benchmarking activities</li> <li>• Write nominations</li> <li>• Perform quality review</li> </ul>	High-quality, accurate, and creative presentation of nominees' successes
8 <b>Reconnect with panel of industry experts</b>	Finalize the selection of the best-practice award recipient	<ul style="list-style-type: none"> <li>• Review analysis with panel</li> <li>• Build consensus</li> <li>• Select winner</li> </ul>	Decision on which company performs best against all best-practice criteria
9 <b>Communicate recognition</b>	Inform award recipient of award recognition	<ul style="list-style-type: none"> <li>• Present award to the CEO</li> <li>• Inspire the organization for continued success</li> <li>• Celebrate the recipient's performance</li> </ul>	Announcement of award and plan for how recipient can use the award to enhance the brand
10 <b>Take strategic action</b>	Upon licensing, company may share award news with stakeholders and customers	<ul style="list-style-type: none"> <li>• Coordinate media outreach</li> <li>• Design a marketing plan</li> <li>• Assess award's role in future strategic planning</li> </ul>	Widespread awareness of recipient's award status among investors, media personnel, and employees

## About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, enables clients to 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 practice models to drive the generation, evaluation and implementation of powerful growth strategies. Frost & Sullivan leverages almost 50 years of experience in partnering with Global 1000 companies, emerging businesses and the investment community from 31 offices on six continents. To join our Growth Partnership, please visit <http://www.frost.com>.