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Background and Company Performance

*Industry Challenges*

**Image Visualization a Core Component of the Diagnostic Workflow**

Image visualization is a core component in the diagnostic workflow in radiology, as one of the key steps in the chain of events that leads from the acquisition of an image to a final diagnosis. As the workflow step preceding study interpretation, image visualization is a core element of two complementary processes that take place simultaneously: the imaging chain from a technical standpoint, and the diagnostic process from a clinical standpoint.

The radiologist is undoubtedly the most precious resource of any medical imaging enterprise, and improved image visualization capabilities empower the profession by optimizing the diagnostic value obtained from images. Other elements of the workflow, such as image acquisition, image distribution or image archiving, are more transparent to radiologists than image visualization, which they interact with directly on a daily basis.

**From Viewing Images to a Visualization Experience**

Image visualization plays a vital role in the interpretation of a diagnostic imaging study and, more broadly, in the assessment of a patient’s imaging record. It can be a determining factor in the radiologist’s efficiency and as such, diagnostic displays have an important role to play in the value proposition of medical imaging as a whole.

From providing radiologists with the best possible presentation of multi-modality image datasets with the highest available image quality, to contributing to higher comfort levels and reducing eye fatigue during long work hours, diagnostic displays are essential tools for maximizing the radiologist’s productivity and quality of work.

**Multi-Modality and Color Viewing Calling for Industry Advances**

In line with the ongoing trend for health systems to integrate their health care services and points of care, the medical imaging field is increasingly leveraging its entire arsenal of modalities. This is part of the discipline’s ongoing effort to maximize and demonstrate the value that it provides to the healthcare enterprise.

In this context, reviewing patients’ imaging record across imaging modalities is becoming increasingly popular, and being encouraged by emerging guidelines. When images from prior or adjunct studies are available, running side-by-side comparisons and image fusions is a clinical best practice that enhances diagnostic interpretations and treatment decisions. This is true for breast imaging and several other diagnostic areas, including but not limited to oncology.
The Diagnostic Display as a Driver for Clinical Integration

Many aspects of imaging informatics continue to suffer from decades of siloed evolution of certain imaging service lines and imaging modalities. Such is the case for breast imaging informatics, which have traditionally been limited to support grayscale mammography image viewing, but which today require a fundamentally new design.

However, the industry continues to respond with technology advances that serve to unify the imaging portfolio and break the technical boundaries still opposing multi-modality integration. For example, over the last two decades, image archiving has evolved from stand-alone single-modality solutions to a multi-modality archiving solution under picture archiving and communication systems (PACS), and subsequently to vendor-neutral archiving. It is now taking the next leap forward to healthcare content management.

For image visualization to evolve in the same manner there is a need for a new generation of diagnostic displays. These upgraded systems need to contribute effectively to unifying the diagnostic imaging service line, and to harmonizing the value proposition of medical imaging as a whole.

Focus on the Future and Best Practices Implementation

Focus on Unmet Needs

Coronis Uniti, the diagnostic display system introduced by Barco in 2014, represents a brand new generation of diagnostic imaging displays. It is not only a new premium product, but also an evolutionary platform designed to gradually meet all the varying requirements of a wide range of imaging specialties.

The range of features provided by Coronis Uniti is truly impressive. Its 33-inch display provides high-quality grayscale and color image viewing, and allows for high-performance image manipulation of both 2D and 3D and both static and dynamic image datasets.

Armed with a world-class feature set, Coronis Uniti is the only diagnostic display system in the market today that can support both PACS and mammography. As such, it is the best available example of a universal imaging display system that can support every type of procedure across imaging modalities. Toward that goal, Barco is working diligently to continually enhance Coronis Uniti’s capabilities from a technical and regulatory standpoint.

Growth Pipeline

Barco is being extremely proactive as part of industry efforts to establish new standards for diagnostic-grade color in medical imaging. Coronis Uniti uses highly advanced technology to enhance every aspect of color image visualization and maximize the diagnostic value of color in image viewing. Coronis Uniti has brought to the marketplace
the most cutting-edge advances in color viewing, through its industry-leading color monitoring, color correction, color calibration, and color stabilization capabilities.

Barco also makes significant contributions to the educational and lobbying efforts that are necessary to advance the regulatory environment and the clinical adoption curve. Indeed, while a majority of diagnostic images today have a color component, there are still no established standards or quality requirements to ensure color images are used in a diagnostically meaningful way.

In this context, Barco is actively participating in all the critical industry efforts taking place to establish standards for the use of color in medical imaging. This includes defining the color standard display function (CSDF) and participating in the American Association of Physicists in Medicine (AAPM) Task Group 196, the International Electrotechnical Commission’s (IEC) committee establishing standards to ensure the safety and performance of diagnostic color displays, and the International Color Consortium (ICC) defining color spaces and profiles for medical displays.

Blue Ocean Strategy

The diagnostic imaging display systems market is mainly a replacement market. It takes an extremely innovative product that can offer a significant upgrade in value to get end users to replace existing systems. Coronis Uniti is entering a fairly saturated market, but it is also introducing notable enhancements to image quality and productivity, which are typically the top two most important product selection criteria for new diagnostic display systems purchases.

Moreover, Barco enjoys considerable brand equity in the market. The company has a reputation as a provider of reliable and quality goods and services, which are the two most important vendor selection criteria for new diagnostic display system purchases.

Barco has the credibility to be able to articulate a value proposition for Coronis Uniti that far surpasses that of the previous generations of products. The value extends beyond the core diagnostic benefits to imaging departments, to carrying these benefits up to the health system level. Indeed, Coronis Uniti has the potential to elevate a healthcare organization’s diagnostic viewing environment and contribute actively to meeting many of the high-level objectives sought by these organizations, such as enabling earlier detection of pathologies, gaining more confidence in final diagnoses, and reducing the rate of patient recalls.

Growth Performance

For its first growth phase, Barco has focused its development efforts on multi-modality breast imaging, a natural fit for Coronis Uniti. It is fast becoming a platform supporting the full gamut of breast imaging modalities, including the latest, most cutting-edge
advancement in breast imaging, digital breast tomosynthesis (DBT), or 3D mammography.

Barco’s close and longstanding collaborations with its industry partners have allowed it to play an active role in the development of DBT, which is arguably the most significant development of the decade in medical imaging.

As the first few months of Coronis Uniti’s phased launch into various global markets have shown, customers are recognizing the added value of this new premium product. Prospective customers are much more diligent today in their due diligence around the return on investment (ROI) and total cost of ownership (TCO) modelling that needs to be done in the context of value-based purchasing. These developments in purchase considerations are clearly working out in favor of Coronis Uniti.

**Operational Efficiency**

Standardizing the diagnostic reading environment across an imaging enterprise is becoming a strategic imperative for health systems as they start tracking patient outcomes at the system level. It is becoming increasingly important for health systems to reduce the disparities in radiologist access to high quality images across diagnostic reading locations throughout the enterprise. It is also important to support the mobility of radiologists by enabling them to work off-site (from home, for instance) and to ensure that they have access to the highest image quality when they do so.

Moreover, as provider networks continue to grow larger, they are consolidating the information technology (IT) management functions as well. In these increasingly centralized models, it becomes essential to empower IT managers with more powerful tools that help them support an ever-increasing workload.

Barco helps IT management by enhancing remote monitoring capabilities for the displays fleet, streamlining the quality assurance, testing, regulatory, and certification processes, and automating routine tasks like calibration. It is empowering IT management by enabling them to adopt a preventative approach to device maintenance and achieve higher efficiency and predictability over an extended product lifetime.

**Technological Sophistication**

One of the major advantages offered by Coronis Uniti is that it represents a single-display alternative to the conventional primary reading workstation display configuration. Currently, diagnostic workstations comprise between three or four side-by-side displays of which typically two are diagnostic-grade displays and two are non-diagnostic-grade displays. The conventional workstation configuration limits the radiologist’s ability to compare and manipulate images from multiple modalities simultaneously. Coronis Uniti’s
large display surface allows radiologists to develop more flexible and elaborate hanging protocols and also provides ideal viewing distance, viewing angle, ergonomics, and comfort.

Its sophisticated technology helps Coronis Uniti meet and exceed the requirements of the most demanding specialty areas of imaging, such as cardiovascular catheterization, functional or DTI magnetic resonance imaging (MRI), multi-modality breast imaging, and neuroradiology applications such as brain perfusion computed tomography (CT), stroke and cognitive impairment assessments.

Coronis Uniti complements Barco’s wide range of imaging displays which includes every kind of acquisition, technologist, diagnostic, and review workstations. Its holistic value proposition appeals to all the image-using and image-producing specialties, such as radiology, cardiology, neurology, and pathology, across the various points of care, including reading rooms, operating rooms, intensive care units, and interventional suites.

**Conclusion**

Barco’s latest diagnostic display system, Coronis Uniti, embodies years of clinical research and product development. The company continues to work to advance the medical imaging field, and Barco is leading the innovation drive necessary to realize the next leap forward in diagnostic image visualization. With the successful introduction of the next-generation diagnostic display, Barco has once again stepped up to its market leadership role in the global medical imaging displays market.

In recognition of its strong overall performance, Barco has earned Frost & Sullivan’s 2015 Visionary Innovation Leadership Award in Medical Imaging Visualization.
Significance of Visionary Innovation Leadership

A visionary innovation leadership position enables a market participant to deliver highly competitive products and solutions that transform the way individuals and businesses perform their daily activities. Such products and solutions set new, long-lasting trends in how technologies are deployed and consumed by businesses and end users. Most important, they deliver unique and differentiated benefits that can greatly improve business performance as well as individuals’ work and personal lives. These improvements are measured by customer demand, brand strength, and competitive positioning.

Understanding Visionary Innovation Leadership

Visionary Innovation is the ability to innovate today in the light of perceived changes and opportunities that will arise from Mega Trends in the future. It is the ability to scout and detect unmet (and as yet undefined) needs and proactively address them with disruptive solutions that cater to new and unique customers, lifestyles, technologies, and markets. At the heart of visionary innovation is a deep understanding of the implications and global ramifications of Mega Trends, leading to correct identification and ultimate capture of niche and white-space market opportunities in the future.
Key Benchmarking Criteria

For the Visionary Innovation Leadership Award, Frost & Sullivan analysts independently evaluated two key factors—Focus on the Future and Best Practices Implementation—according to the criteria identified below.

Focus on the Future
- Criterion 1: Focus on Unmet Needs
- Criterion 2: Visionary Scenarios through Mega Trends
- Criterion 3: Growth Pipeline
- Criterion 4: Blue Ocean Strategy
- Criterion 5: Growth Performance

Best Practices Implementation
- Criterion 1: Vision Alignment
- Criterion 2: Process Design
- Criterion 3: Operational Efficiency
- Criterion 4: Technological Sophistication
- Criterion 5: Company Culture

Best Practice Award Analysis for Barco

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 Focus on the Future and Best Practices Implementation (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 VISIONARY INNOVATION LEADERSHIP AWARD**

<table>
<thead>
<tr>
<th>Visionary Innovation Leadership</th>
<th>Focus on the Future</th>
<th>Best Practices Implementation</th>
<th>Average Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barco</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Competitor 2</td>
<td>8</td>
<td>7</td>
<td>7.5</td>
</tr>
<tr>
<td>Competitor 3</td>
<td>7</td>
<td>8</td>
<td>7.5</td>
</tr>
</tbody>
</table>

**Focus on the Future**

**Criterion 1: Focus on Unmet Needs**
Requirement: Implementing a robust process to continuously unearth customers’ unmet or under-served needs, and creating the products or solutions to address them effectively.

**Criterion 2: Visionary Scenarios through Mega Trends**
Requirement: Incorporating long-range, macro-level scenarios into the innovation strategy, thereby enabling “first to market” growth opportunities solutions.

**Criterion 3: Growth Pipeline**
Requirement: Best-in-class process to continuously identify and prioritize future growth opportunities leveraging both internal and external sources.

**Criterion 4: Blue Ocean Strategy**
Requirement: Strategic focus in creating a leadership position in a potentially “uncontested” market space, manifested by stiff barriers to entry for competitors.

**Criterion 5: Growth Performance**
Requirement: Growth success linked tangibly to new growth opportunities identified though visionary innovation.

**Best Practices Implementation**

**Criterion 1: Vision Alignment**
Requirement: The executive team is aligned on the organization’s mission, vision, strategy and execution.

**Criterion 2: Process Design**
Requirement: Processes support the efficient and consistent implementation of tactics designed to implement the strategy.

**Criterion 3: Operational Efficiency**
Requirement: Staff performs assigned tactics seamlessly, quickly, and to a high quality standard.
Criterion 4: Technological Sophistication
Requirements: Systems enable companywide transparency, communication, and efficiency

Criterion 5: Company Culture
Requirement: The executive team sets the standard for commitment to customers, quality, and staff, which translates directly into front-line performance excellence

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 VISIONARY INNOVATION LEADERSHIP AWARD

[Diagram showing a graph with the axes for Best Practices Implementation and Focus on the Future, with points for Barco, Competitor 2, and Competitor 3 plotted.]
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 7 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.
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.

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