



Fovia, Inc. Recipient of the
2011 North American Advanced Visualization in Medical Imaging
Product Leadership Award



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Award Recipient: Fovia, Inc.

Next generation healthcare not only produces better patient outcomes, but provides a more efficient care cycle than previous delivery models. To accomplish this, a great deal of technological innovation is required, and specialty vendors must address each specific step of the longitudinal workflow. One such step is to ensure that advanced visualization optimizes workflow efficiency. Frost & Sullivan has been tracking the industry vendors' efforts toward enhancing medical imaging workflow efficiency. Based on the findings of this Best Practices research, Frost & Sullivan is proud to present the 2011 North American Product Leadership Award for Advanced Visualization in Medical Imaging to Fovia, Inc.

Company Background

Fovia, Inc. was founded in 2003 to address the challenges of data explosion – the exponentially increasing amount of data being acquired by modern imaging modalities. The firm has developed a CPU-based, High Definition Volume Rendering® software solution that leverages and scales with multi-core, multi-processor and multi-threaded generational processor development. Fovia's HDVR® solution is more scalable, cost-effective, flexible and easily deployable on an enterprise-wide basis than GPU or other hardware-based approaches. With *HDVR® Connect*, original equipment manufacturers (OEMs) can quickly and cost-effectively offer the world's most advanced volume rendering to their customers.

Frost & Sullivan's Global Research Platform

Frost & Sullivan is in its 50th year in business with a global research organization of 1,800 analysts and consultants who monitor more than 300 industries and 250,000 companies. The company's research philosophy originates with the CEO's 360-Degree Perspective™, which serves as the foundation of its TEAM Research™ methodology. This unique approach enables us to determine how best-in-class companies worldwide manage growth, innovation and leadership.

Benchmarking Criteria

For the Product Leadership Award, the following criteria were used to benchmark Fovia's performance against key competitors:

- Product Features/Functionality
- Innovative Elements of the Product
- Product Acceptance in the Marketplace
- Provides Customer Value Enhancements
- Product Quality

Product Features/Functionality

Fovia's flagship product, *HDVR® Connect*, is a software-based, advanced visualization solution that includes all of the key attributes required by today's vendors and their customers: performance, quality, scalability, anytime/anywhere image access, cost-effectiveness and flexibility. OEM vendors can integrate Fovia's High Definition Volume Rendering® platform both locally and remotely via an easy-to-use SDK (software development kit). With *HDVR Connect*, OEM vendors can deliver unrivaled image quality and uncompromised performance in 2D, 3D and 4D advanced volume visualization applications.

HDVR Connect takes full advantage of the trends in both imaging and computing—larger datasets, larger projection displays, multi-core processors, multi-threading, multi-CPU environments and server-side rendering—without sacrificing quality or performance. In today's imaging informatics market, products and technologies must be able to evolve seamlessly and in tandem with vendor and customer needs to succeed: in this regard, the multi-dimensional scalability of *HDVR Connect* provides Fovia with clear and sustainable competitive advantages.

Fovia's HDVR® architecture enables any networked desktop, laptop or tablet to serve as an advanced 3D post-processing workstation, allowing "anytime, anywhere" access to imaging workflow. With *HDVR Connect*, Fovia's vendors can boost enterprise-wide product penetration at their customers' locations, thereby substantially augmenting the imaging value chain by increasing visualization access and expanding the capacity for advanced applications.

HDVR Connect offers numerous enterprise access capabilities, facilitating integration. The SDK is hardware agnostic, backward compatible and cross-platform, running on Windows, Linux, Mac and iOS platforms with off-the-shelf hardware. Most permutations of servers and clients are possible; for example, a hospital using *HDVR Connect* could run a Windows, Linux or Mac server, while concurrently enabling thin clients to use Windows, Linux, Mac and iOS operating systems. Fovia also offers flexible integration options to OEMs through deep, native integration via an SDK-API with Java, C++ or .NET/C#.

Innovative Elements of the Product

The amount of thin-slice, volumetric data acquired by modern imaging modalities continues to increase at an exponential rate. Thousands of CT slices can now be captured in less time than it took to capture 50 slices just a decade ago. This increased data production has made medical case evaluation based entirely on axial slice (source) images virtually impossible. Viewing hundreds or thousands of images in 2D on x-ray film, using a traditional backlit light box, is impractical, time-consuming and expensive.

Advanced 3D visualization has become a critical component of medical care, and 3D analysis is essential in areas such as clinical diagnosis and surgical planning. Three-dimensional views improve surgical outcomes by giving physicians a better "road map" from which to plan procedures. By interactively navigating volume data from scanners, physicians can also spare some patients from invasive procedures such as endoscopy or conventional angiography. Similarly, in the dental field, advanced visualization tools have become critical in a number of specialties, including implantology, orthodontia and TMJ treatment.

Three-dimensional imaging is a valuable tool for optimizing therapies and minimally invasive surgeries, eliminating unnecessary tests and treatments, accelerating diagnoses and gaining additional insight needed for clinical decisions. Driven in part by overall cost pressures in the healthcare system, the high cost of imaging equipment, and by a shortage of radiologists, an increased workload must now be completed with the same or fewer resources as before. Speed in interpreting images is essential for increasing workflow productivity and avoiding bottlenecks caused by the large number of images being generated. Therefore, from both a cost and a quality of service perspective, there is a clear need for efficient, high quality advanced visualization tools.

However, despite the well-established need for advanced visualization tools and the dramatic improvements in the technology used to acquire volumetric data, the technological advancements required for efficient visualization and distribution of such data have been slow to materialize. This disparity has resulted in bottlenecks, inefficient workflow, poor visualization quality and performance, missed or delayed diagnoses and increased liability.

Prior to the introduction of Fovia's CPU-based HDVR software, existing solutions were unable to handle the large volumes of data being generated, and they had many limitations, including: expensive graphics cards or specialized hardware (ASICs); significant trade-offs between image quality, speed and cost; inability to easily distribute images remotely (therefore requiring a dedicated, advanced visualization workstation); inflexibility; non-scalability; and a high obsolescence factor.

Fovia's HDVR technology, on the other hand, has successfully overcome these volumetric data challenges through its proprietary, volumetric ray-tracing algorithms that deliver on-the-fly interactive, deep super-sampling quality and superior performance. With *HDVR Connect*, large volumes of data can be visualized and analyzed in high definition—both locally on workstations and remotely via server-based, thin-client technology. The ability of *HDVR Connect* to overcome these volumetric data challenges with a software-based solution that runs on off-the-shelf CPUs represents a breakthrough innovation for the advanced visualization market.

Product Acceptance in the Marketplace

Fovia maintains the entrepreneurial spirit that has fueled the company since its inception, and it continues to develop expertise and leadership in the medical imaging OEM market. The thin-client architecture of the HDVR platform, combined with its low bandwidth and memory requirements, enable exceptional remote access capabilities on virtually any off-the-shelf computer or mobile device. This server-based processing approach optimizes the current IT consolidation trend taking place in the hospital market, where IT management is being centralized to generate workflow productivity efficiencies and reduce total cost of ownership.

Utilizing its core competencies, Fovia initially maintained a strategic focus on medical imaging. Its customer base includes many leading vendors of advanced visualization and PACS (picture archiving and communication system) solutions, thereby illustrating the company's success in its original target market. These vendors include GE Healthcare; Vital Images, a Toshiba Medical Systems Group Company; Ethicon, a Johnson & Johnson Company; and a variety of PACS companies, including Merge Healthcare, DR Systems, Intelrad and BRIT Systems.

In a concurrent effort to expand and leverage its High Definition Volume Rendering platform, Fovia has also made excellent progress outside of the medical space. Its value proposition for the medical imaging market resonates well in other industries, many of which must address the same challenges faced by medical imaging vendors. Non-medical imaging customers using Fovia's High Definition Volume Rendering include the National Aeronautics and Space Administration (scientific); U.S. Department of Defense (military); Pfizer (pharmaceutical); Schlumberger (oil & gas); 3M (dental); Tyco (industrial); Animage (veterinary); and Pearson (medical education).

The company has also signed approximately 500 research agreements with leading universities and research institutions around the world, ensuring that Fovia's High Definition Volume Rendering remains at the forefront of advanced visualization, with numerous applications in a variety of fields.

Provides Customer Value Enhancements

Vendors of imaging analytics solutions are able to enhance their product offerings rapidly and cost-effectively due to the flexibility of the *HDVR Connect* SDK. This translates into reduced time to market for new or upgraded solutions and allows vendors to focus their internal research and development efforts on other customer needs. Fovia's PACS customers can quickly embed HDVR into their PACS offering, which not only enhances their ability to work interactively with huge datasets in real time, but also enables them to do so as part of a unified workflow within a consistent viewing environment.

The *HDVR Connect* SDK allows Fovia's vendors to use their own proprietary user interfaces and be extremely responsive to their customers, since vendors can quickly and easily add or modify functionality, buttonology or workflow. Fovia's vendors can also create their own development roadmap for additional 3D features by utilizing existing functionality from the *HDVR Connect* rendering engine. Moreover, Fovia's High Definition Volume Rendering can "power" the visualization of a vendor's proprietary algorithms, such as specialized segmentation, enabling the vendor to continue to use such algorithms. This flexibility and vendor self-determination ensures consistency with a vendor's own product release timeline, and empowers Fovia's vendors to independently meet ever-changing market conditions. Ultimately, this provides Fovia's vendors with a superior long-term solution.

Fovia's engineering team is extremely effective in working with its vendors to deeply integrate High Definition Volume Rendering into end user products so that proprietary user interfaces and algorithms are combined with Fovia's HDVR. This allows the vendors to optimize the way they deploy their solutions at customer facilities, to increase the value they deliver to an enterprise-wide end user base, and ultimately to differentiate themselves from the competition.

Product Quality

Fovia has never lost a customer in its eight-year history, as its HDVR technology quickly becomes a core attribute of, and competitive advantage for, its customers' solutions. This stability provides a strong testament to the quality and related value proposition of both *HDVR Connect* and Fovia's High Definition Volume Rendering platform, particularly considering that advanced visualization is a competitive field in which new technologies emerge on a regular basis.

Fovia's technology is continually improving, and in addition to its own rigorous quality assurance program, Fovia's customers routinely "stress" the HDVR technology through a variety of quality control exercises. Consequently, issues are typically spotted very early, and any required modifications are made before the HDVR technology is in the hands of the end users. Working in tandem with customers provides additional benefits. Fovia's customer requirements have resulted in the continual introduction of new features and functionality, improved quality and performance, support for more operating systems and additional integration capabilities.

Another testament to the high product quality of *HDVR Connect* is that Fovia is rarely required by its customers to troubleshoot the product once the integration has been completed. Conversely, Fovia proactively works with its customers to help them take full advantage of *HDVR Connect* and capitalize on rapid advances in related technologies.

Conclusion

The market environment for medical imaging informatics has changed since the economic recession. While capital IT spending has decreased, the providers of medical imaging services have increased their investments into value-added system upgrades to boost efficiency. Rather than creating an unfavorable environment, this shift in demand has resulted in more opportunities for Fovia to expand within and beyond the medical imaging field and accelerate its international growth. Now armed with a fully established and highly successful product, *HDVR Connect*, Fovia, Inc., the recipient of Frost & Sullivan's Technology Innovation Award in 2009, is today the deserving recipient of the 2011 North American Product Leadership Award for Advanced Visualization in Medical Imaging.



About Frost & Sullivan

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