

# RSNA Radiologist Preference Study

**F**or more than 15 years, VIDAR Systems Corporation has been dedicated to the development of high quality, affordable, reliable film digitizers for a wide variety of medical imaging applications. In keeping with its commitment to

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product leadership, the company supports the ongoing clinical study of its family of digitizers at leading institutions worldwide. One such study, “The Great

Digitizer Shootout,” was sponsored by VIDAR at the 1999 annual meeting of the Radiological Society of North America (RSNA).

The Great Digitizer Shootout reinforced the results of prior clinical studies—that there is no clinically significant difference in radiologists’ preference between images scanned with VIDAR digitizers and more expensive laser systems. In addition, the study had a significantly more varied and larger radiologist base than previous studies. Based on the results of these studies, the clinically proven image quality of VIDAR digitizers, combined with their lower total operating cost and superior reliability, make them the leading choice for radiologists.

## Laser Versus CCD

Traditionally, radiologists have used laser digitizers because of their high image quality. Laser digitizers,

however, have a number of weaknesses, including:

- The purchase price of laser digitizers can be twice that of VIDAR digitizers.
- Their design requires frequent maintenance, contributing to substantial repair costs over the lifetime of a device.
- Laser digitizers require semi-annual service for device calibration because a phenomenon known as thermal drift degrades image quality.
- Routine service adds \$2,000 or more per year to the total cost of ownership of laser digitizers and results in significant downtime.

In contrast, VIDAR digitizers require no routine calibration or maintenance and they have a proven track record of reliability and durability.

VIDAR recently introduced the latest generation of its High Definition CCD (HD-CCD™) digitizers, which

**VIDAR Systems Corporation, the leading manufacturer of x-ray film digitizers, is committed to providing high quality, reliable, and affordable digitizers to meet the needs of healthcare providers worldwide. The company also is committed to promoting an exchange of information that helps healthcare providers improve their delivery of care. In keeping with this philosophy, VIDAR has developed the VIDAR Case History Series to relate the experiences of healthcare organizations that have adopted its line of advanced film digitizers. For new and prospective users, these experiences illustrate how VIDAR’s technology can bring quality and value to their institutions and help support the delivery of patient care**

provide clinically proven image quality and higher reliability, at a significantly lower overall cost. VIDAR’s “plus” product enhancements include Automatic Digitizer Calibration (ADC™), which automatically recalibrates the digitizers every five seconds to ensure optimum image quality in every image scanned, and ASSURE™ quality assurance software, which documents that VIDAR digitizers are performing at optimal levels while helping organizations meet their quality control/quality assurance and regulatory requirements. The leading suppliers of PACS and teleradiology systems now offer VIDAR digitizers in place of or as an alternative to laser digitizers.

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### The Great Digitizer Shootout

VIDAR supports the clinical evaluation of its digitizers so that radiologists can use the company’s products with confidence. With that premise in mind, the company envisioned an image comparison study, where radiologists would view side-by-side images scanned with both a VIDAR DiagnosticPRO™ Film Digitizer and the Lumisys Lumiscan™ 75 laser digitizer. The preference study would focus on real-world clinical situations, using a sampling of radiologists from all walks of life. The 1999 RSNA meeting would serve as the perfect venue, and would provide the many radiologists in attendance the opportunity to participate.

### Study Design

VIDAR called on two of the industry’s leading organizations to create the preference study. Medical imaging systems experts at IMAGE Smiths were responsible for the study design. The study called for two images to be presented side-by-side on a high-resolution, dual-screen display system. The software used for the study originally was created by IMAGE Smiths for the Uniform Services University of the Health Sciences mammography program, which loaned the display system for use during The Great Digitizer Shootout. The system would allow participating

radiologists to view randomly selected image pairs quickly and simultaneously. The radiologists would then be able to choose which image they preferred, or affirm that they saw no difference in image quality.

The Electronic Radiology Lab (ERL) at the Mallinckrodt Institute of Radiology (MIR) also participated in the study design. The MIR, part of the Washington University School of Medicine in St. Louis, is one of the largest and most sophisticated radiological institutions in the world. Ed Muka, a research associate at MIR and a recognized expert in image science, selected and digitized 15 sets of radiographs (30 images total) of varying diagnostic difficulty, including normal and under- and over-exposed films. In order to ensure that every image was linear with optical density and could be compared, Muka developed look-up tables to ensure that all the images were standardized according to the National Institute of Standards and Technology. According to Muka, the standardization of the images was a critical requirement. “The radiologists were going to be looking at a digitized image, not the hard copy,” he said. “Therefore, it was vital that every image be the same so they were easy to compare.”

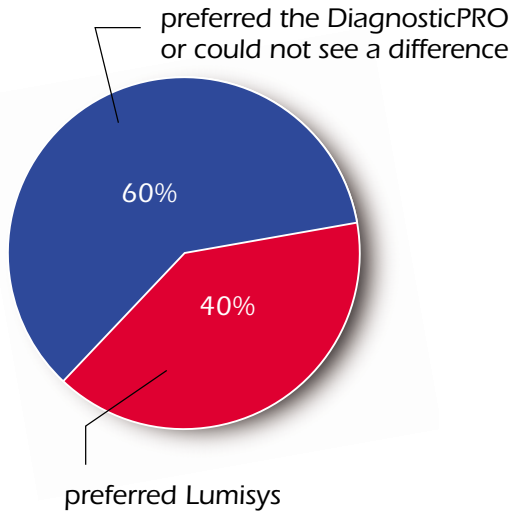
In the double-blind study, VIDAR invited radiologists attending the RSNA meeting to view up to 15 image pairs on the display monitor at the VIDAR booth. Each participant was able to view a wide range of radiographs, from chest images to cervical spine shots. While viewing the images, radiologists could select the image they preferred (without knowing which digitizer created the images) or indicate they saw no clinically significant difference between the two displayed images. More than 170 radiologists of varying backgrounds and technical expertise levels participated in the study.

### Results & Conclusions

An analysis of the results showed that in nearly 60 percent of the 2,800 image pairs viewed, radiologists either preferred images digitized with the VIDAR DiagnosticPRO or had no preference between VIDAR- and Lumisys-scanned images. The results offered additional evidence that there are no significant differences in the quality of images digitized using the two products.



## The Great Digitizer Shootout



Based on the response of 170 radiologists who viewed 2,800 images as part of The Great Digitizer Shootout sponsored by VIDAR Systems Corporation at the 1999 annual meeting of the Radiological Society of North America.

According to PACS consultant Michael Cannavo, president of Image Management Consultants, the preference study was the largest of its kind conducted to date and reflected real-world clinical scenarios. “The findings clearly demonstrated that in a real-world setting, a large sampling of radiologists could not tell the difference between the Lumisys- and VIDAR-scanned images,” Cannavo said. “What the industry needs is a cost-effective digitizer option that provides radiologists with a high-quality image that is acceptable for doing primary diagnosis of films. That is why it was important to do an analysis between laser and CCD digitizers. Laser digitizers produce excellent image quality but have a number of issues relating to service, maintenance, and other operating costs.

“In an era of ongoing cost restraints, clinicians must carefully evaluate technology for the value it provides,” Cannavo said. “In light of clinical studies, such as The Great Digitizer Shootout, radiologists and administrators can now confidently adopt CCD digitizers like VIDAR’s to meet their needs for exceptional image quality, reliability, and cost-effectiveness.”

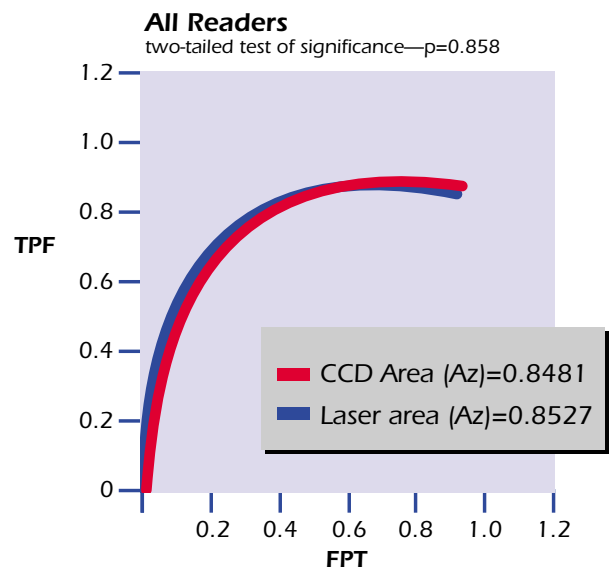
### Other Studies

The results of The Great Digitizer Shootout support previous findings showing that VIDAR’s new generation of advanced film digitizers deliver image quality equal to that of laser digitizers. For example, a recent

landmark clinical study conducted at The Johns Hopkins Medical Institutions compared the diagnostic accuracy, sensitivity, specificity, and receiver operator characteristics (ROC) of the VIDAR DiagnosticPRO and the Lumisys Lumiscan 75. The study demonstrated that there is no difference in image quality or the ability of radiologists to make accurate diagnoses between radiographs digitized with the two systems.

Johns Hopkins has initiated two additional studies to evaluate VIDAR’s digitizers, the results of which are expected to be published in late 2001. The first is a ROC study of VIDAR’s DiagnosticPRO *plus* digitizer with enhanced mammography resolution. The study will compare radiologists’ readings of mammography images scanned using the DiagnosticPRO *plus* with their interpretations of the examinations viewed on the original films. The second study will focus on VIDAR’s SIERRA™ *plus* digitizer and will compare radiologists’ interpretations of general radiography examinations looking at scanned images versus the hard-copy original films. VIDAR also will support a general radiography preference study featuring the SIERRA *plus* at the Mallinckrodt Institute of Radiology. ●

## ROC Analysis of the Accuracy of Radiographic Interpretations for Two Types of Digitizers



Y Axis = True Positive Fraction (TPF)  
X Axis = False Positive Fraction (FPF)

Source: Joseph Gitlin, DPH, The Johns Hopkins Medical Institutions

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## IMAGE Smiths

IMAGE Smiths, Inc., a Maryland-based company, specializes in the design and development of medical image display systems and the quality assurance of image display workstations. The company also provides customized workstations and can perform data collection and analysis for projects dealing with digital image displays. For information, visit the IMAGE Smiths Web site at [www.image-smiths.com](http://www.image-smiths.com).

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## The Electronic Radiology Laboratory, Mallinckrodt Institute of Radiology

The Electronic Radiology Laboratory (ERL), based in St. Louis, is one of nine research laboratories within the Division of Radiologic Sciences, Mallinckrodt Institute of Radiology, Washington University School of Medicine. The ERL was established to investigate digital imaging technologies (acquisition, storage, communications, and display) important to the distributed radiology department of the future, and to the responsive delivery of clinical image information to the medical decision-maker. Key project areas include image science, information and image management, and telecommunications for medical imaging. The lab's scope of activities recently has been expanded to encompass image processing in support of clinical research in radiology. For more information about the ERL, visit its Web site at <http://wuerlim.wustl.edu>.

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## The VIDAR Family of Film Digitizers

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VIDAR Systems Corporation offers a family of award winning, high-quality film digitizers designed for a variety of clinical applications. The image quality of VIDAR's digitizers has been proven in clinical studies at leading centers around the world. VIDAR's family of film digitizers serves the PACS, remote primary diagnosis, teleradiology, telemedicine, mammography, and oncology treatment markets, and has been selected by more than 100 leading systems solution providers for inclusion in their product offerings. For more information about VIDAR's medical imaging products and services, call 1-800-471-SCAN or visit [www.filmdigitizer.com](http://www.filmdigitizer.com).



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