

Inova Fairfax Hospital

The Radiation Oncology Department at Inova Fairfax Hospital in Falls Church, Virginia, is a busy patient care area, delivering state-of-the-art treatment to 120–140 patients each day (approximately 1,200 patients a year). Breast and prostate cancer patients make up a majority of patients seen each day, but other cancers are treated as well, including brain,

pancreatic, rectal, and esophageal. Inova Fairfax Hospital is part of the Inova Hospital System, serving patients in Northern Virginia and the metropolitan Washington D.C. area.

The VXR-16 allows radiation oncologists to optimize the radiation dose, measure tumor volume, and minimize potential radiation of normal surrounding tissue prior to the delivery of the prescribed treatment.

According to Coleman Rosen, a radiation physicist in the department, an advanced radiation treatment planning system from Computerized Medical Systems (CMS), Inc., plays an important role in the radiation oncology area, used by dosimetrists to develop oncology treatment plans. The FOCUS™ System is a three-dimensional radiation treatment planning system that offers speed, accuracy, and ease of use.

The FOCUS System features a VIDAR film digitizer, provided through a partnership agreement with market leader VIDAR Systems Corporation. VIDAR has more than 10 years of experience serving the oncology market and is the most trusted name in film digitizers. The digitizer converts hard-copy x-ray, CT, ultrasound, and MRI films to high-quality digital images that can be electronically transmitted, viewed, and stored, facilitating the department's efforts to provide the

most advanced cancer care. CMS selected the VIDAR digitizer for inclusion in its system due to the digitizer's high image quality, reliability, and affordability, as well as VIDAR's long history serving the oncology community.

The digitizer is a key part of the CMS system and is used by dosimetrists at the facility to digitize CT and MRI images that were not produced at the hospital. (CT images taken at Inova Fairfax Hospital are directly networked into the CMS system.) Once the images are digitized, the dosimetrists can incorporate them into the CMS system and generate an appropriate treatment plan.

Prior to the implementation of the VIDAR digitizer, images taken off-site could not be scanned and

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.



The VIDAR VXR-16 Film Digitizer in use at the Radiation Oncology Department at Inova Fairfax Hospital.

acquired by the CMS system. As a result, images had to be re-shot with the digital system, increasing costs, inconveniencing patients, and adding to the staff's workload. The CMS system went online in 1997, and the VIDAR digitizer was added two years later. The digitizer recently was upgraded to a VIDAR® VXR-16™ Film Digitizer.

Radiation Treatment Planning

The affordable VXR-16 Film Digitizer meets the unique needs of the oncology community for the exacting application of treatment planning. The digitizer achieves the highest image quality standards for reproduction of CT, MRI, angiography, and dose films, and conforms to American College of Radiology standards for film imaging in radiation oncology. The VXR-16 allows radiation oncologists to optimize the radiation dose, measure tumor volume, and minimize potential radiation of normal surrounding tissue prior to the delivery of the prescribed treatment. The digitizer is capable of scanning 16 bits of grayscale data and features VIDAR's next-generation High Definition CCD (HD-CCD™) technology, which provides a superior optical density range (0.00–3.65) that delivers high diagnostic quality.

According to Rosen, a high quality digitized image is vital for successful treatment planning. "We want the highest quality image because it facilitates the

development of optimal three-dimensional treatment plans for cancer patients undergoing radiation therapy," he said. "With a very high quality image, the treatment planning system can better resolve the location of tumors and healthy tissue. A digitizer that provides a high-quality image is going to allow you to be more accurate in the placement of the radiation beam." Rosen oversees operations in the Radiation Oncology Department, including three linear accelerators, treatment planning systems, record and verify systems, and a CT system. He is one of five physicists working in the department to execute radiation treatment prescriptions ordered by oncologists.

Radiation Dosimetry

The VIDAR digitizer also is utilized by the department for therapy dose analysis and provides consistent, high resolution, reproducible analyses of radiation treatment beams used for cancer therapies. According to Rosen, radiation dosimetry consists of taking patient data and determining the effects of radiation in the hopes of curing or palliating the tumor. The CMS system deployed at Inova Fairfax Hospital provides a three-dimensional view so that the department's physicists can see how the radiation is wrapping around the tumor. By controlling how the radiation wraps around the tumor, physicists can maximize the dose to the tumor and minimize the dose to the adjacent healthy tissue.

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—Coleman Rosen, radiation physicist
Radiation Oncology Department
Inova Fairfax Hospital

For radiation dosimetry, the department uses the VIDAR digitizer to scan films that come off of the accelerator. The digitizer scans the images and then, using quality assurance software from Radiological Imaging Technologies and a personal computer with a





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—Coleman Rosen

Pentium III processor and a printer, the department’s physicists can measure the characteristics of the beam.

“We take a lot of square and rectangular films for quality assurance purposes,” Rosen said. “Film that comes off the accelerators is often not as clear and crisp as diagnostic images. The software, using the high resolution that is provided by the VIDAR digitizer, resolves the images. This allows us to monitor the accelerator’s ability to set field sizes. It gives us control in measuring accuracy and reproducibility, helping us more accurately deliver the treatment dose. We can verify the accuracy of treatment by taking a port film shot with the accelerator, scanning it, and evaluating it with the software to check against what the CMS treatment planning system originally outlined. We can make sure that everything is being treated the way it was planned.”

Radiation treatment is provided by three Primus linear accelerators from Siemens Medical Systems, another of VIDAR’s systems solution partners, which allow for step and movement shooting of radiation from outside the treatment room. According to Rosen, “Now that we are capable of evaluating treatment on a three-dimensional basis, we can more closely measure and evaluate what we are doing.”

Rosen said that the system also stores information, allowing the physicists to compare images and verify that the accelerators are performing to specifications. “It helps us identify any changes that may develop over time,” he said. “The digitizer also allows us to scan

images to be used for comparison purposes in order to verify that the treatment plan is being followed. We have been successfully using the digitizer for this application for approximately 18 months.”

Reliability, Durability & Ease of Use

VIDAR digitizers are engineered for reliability, durability, and ease of use — the digitizers have a mean time between failure of 35,000 hours (the equivalent of four years). They consistently outperform competitive products, even under the most difficult conditions — from high-volume radiology practices to military ships and battlefields. VIDAR’s digitizers have been field-proven for reliable performance in more than 300 mobile radiology vans. They also have successfully completed 40 hours of shock and vibration testing — the equivalent of 40,000 miles. VIDAR’s responsive sales and customer service departments provide customer support.

The durability of the VIDAR digitizer is evidenced by its performance in Fairfax Hospital’s Radiation Oncology Department. Rosen said the system is always on, and there have been no problems. In addition, Rosen said the digitizer is simple to operate. “At Inova Fairfax Hospital, films are digitized in batches, and 10–20 films can be scanned at one time,” he said. “The multiple film feeder allows the staff to stack the film at the beginning of the process rather than feeding the films one at a time. This is convenient and cost-effective for busy patient care providers.”

Staff members at the hospital recognize the high quality, performance, and durability offered by the digitizer. In particular, Rosen said one radiologist was pleased with the performance of the digitizer and plans to use it in conjunction with a project he is directing. In addition, Rosen said the department plans to increase use of the digitizer, possibly using it in conjunction with brachytherapy and for scanning mammographic QA films. “It is one of those tools that you want everything you work with to become — you are comfortable with its use and you don’t give it a second thought,” he said. “The VIDAR digitizer is going to be used a whole lot more.” ●

Inova Fairfax Hospital

Inova Fairfax Hospital, part of the not-for-profit Inova Health System, is a 656-bed regional medical center located in Falls Church, Virginia, which serves the Northern Virginia and Washington D.C. metropolitan areas. In July 1999, *U.S. News & World Report* rated Inova Fairfax Hospital among the nation's best in five specialties, including cardiology/cardiac surgery, neurology and neurosurgery, respiratory disorders (pulmonology), digestive tract (gastroenterology), and urology. The hospital is a medical and nursing teaching facility, affiliated with the medical schools of Georgetown and George Washington Universities and the Medical College of Virginia, and with the nursing schools of George Mason and Marymount Universities and Northern Virginia Community College.

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, teleradiology, mammography, and oncology treatment planning markets and has been selected by the leading systems solution providers for inclusion in their product offerings. In addition, its ASSURE™ Quality Control Software is the first system capable of automatically assessing the performance of film digitizers and was designed to improve patient care, quality control, and regulatory compliance efforts of radiology groups and hospitals. For more information about VIDAR's medical imaging products and services, call 1-800-471-SCAN or visit www.filmdigitizer.com.



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