

Armenian Telemedicine Project

Technological advances in x-ray film digitizers have resulted in CCD (charge coupled device) digitizers that deliver image quality equal to or better than expensive laser digitizers — at up to half the cost. These new digitizers are helping to advance the emerging fields of remote primary diagnosis and telemedicine, which promise to improve access to healthcare for many people who would otherwise

VIDAR donated a state-of-the-art x-ray film digitizer, making specialty care and consultations possible for many people who otherwise would go without treatment.

go without care, and to improve the overall efficiency of diagnostic radiology. One area in particular that stands to gain from the availability

of low cost, high-quality film digitizers is in the use of telemedicine to improve the delivery of healthcare during disaster situations.

In the wake of the deadly magnitude 6.9 earthquake in 1988 that devastated the country of Armenia, in the former Soviet Union, NASA launched one of the first experiments in the use of telemedicine — the “Telemedical Bridge to Armenia.” Other organizations followed with additional experimental telemedicine projects.

Though the devastating earthquake occurred more than a decade ago, Armenia continues to face considerable challenges, especially in providing adequate healthcare to people in both urban and rural areas. Telemedicine tests in the country continue. In 1998, NASA provided funding to the East-West Center of the University of Maryland and the laboratory of Applied Communication Concepts for a significant and very successful telemedicine test — the NASA Telemedicine

Study — between the United States and Armenia. More recently, a charitable foundation funded a low bandwidth telemedicine study to determine what information system improvements were needed for more comprehensive deployment of telemedicine in Armenia. Hampering these efforts, however, was lack of an affordable, high-quality film digitizer that would allow x-rays and other images to be digitized and sent electronically to specialists for consultation — a fundamental capability for effective telemedicine.

To support the ongoing telemedicine projects in Armenia, VIDAR Systems Corporation donated a state-of-the-art x-ray film digitizer, making specialty care and consultations possible for many people who otherwise would go without treatment. The VIDAR® VXR-12 *plus*™ Film Digitizer is a CCD digitizer that converts hard-copy x-ray, CT, ultrasound, and MRI films to digital images that

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 brings quality and value to their institutions and helps support the delivery of patient care.

can be electronically transmitted, viewed, and stored. In Armenia, the VXR-12 *plus* replaced an inexpensive, nonmedical quality scanner that did not provide the level of image quality required for remote primary diagnosis — where accuracy and detail are vital.

Remote Primary Diagnosis

Remote primary diagnosis provides the opportunity for radiologists and other specialists to make diagnoses directly from high-resolution electronic images, rather than relying on hard-copy films. It expands the traditional functions of teleradiology beyond providing

“The quality digitization of x-rays is one of the most important capabilities needed for telemedicine, and the VIDAR digitizer is a key component for telemedicine in our radiology department.”

—Dr. Haik Nikogosian
Armenian Minister of Health

second opinions and after-hours radiology coverage. With the ability to remotely view high-quality electronic images, radiologists now can provide more-timely diagnoses without the delay and expense of traveling to a hospital or clinic, or waiting for films to be sent to their offices. For patients, real-time remote primary diagnosis often eliminates travel to doctors’ offices or clinics — which may be difficult or impossible in disaster areas — lessening the time lost from work as well as anxiety and delayed treatment. Payors and clinicians also benefit by reducing costs incurred due to diagnostic delays.

As a result of these benefits, remote primary diagnosis promises to improve care and convenience for patients while reducing costs and facilitating economic resource allocation for clinicians and payors. In order to be successfully deployed in disaster areas and other difficult environments, however, film digitizers must be affordable, reliable, durable, and able to deliver high-quality images.

VXR-12 *plus* in Armenia

According to Dr. Sarkis Zartarian, president of Applied Communication Concepts and the U.S.-based coordinator for the telemedicine project, the VXR-12 *plus* digitizer

is being used by the doctors of Diagnostica Medical Center, the leading diagnostic medical facility in Armenia. Diagnostica was the pilot diagnostic center for the former Soviet Union.

According to Dr. Haik Nikogosian, Armenian Minister of Health, and founder and former chairman of Diagnostica, the telemedicine project is a vital way to provide much-needed care to the people of Armenia, and the donation of the VIDAR film digitizer — a key tool — will make effective telemedicine possible. “On behalf of Diagnostica and our country, we thank VIDAR for this very generous gift,” Nikogosian said. “The quality digitization of x-rays is one of the most important capabilities needed for telemedicine, and the VIDAR digitizer is a key component for telemedicine in our radiology department.”

The healthcare infrastructure in Armenia was largely destroyed by the quake, which killed more than 25,000, injured 25,000, and caused direct economic losses of \$14.2 billion (U.S.). Armenia, about the size of West Virginia, has a population of 3.5 million. The country is far from recovered from the disaster — an estimated 30,000 people still live in ramshackle temporary huts in the city of Gyumri, the second largest city in Armenia.

According to Zartarian, whose organization also provided telemedicine software to Armenia, the VXR-12 *plus* digitizer provides a number of important benefits to clinicians and the general population of



Dr. Haik Nikogosian, Armenian Minister of Health



Armenia. “The ability to obtain a high-quality digitized image is a key to improving healthcare delivery in disaster situations, where remote consultations with physicians may be required due to damaged facilities or a shortage of specialists,” Zartarian said.

“Though medical personnel are staffed in Guymri, there still is a need for consultation with specialists at the Diagnostica headquarters in Yerevan, the capital city,” he said. “Due to high unemployment and the damaged infrastructure, travel is limited, and high costs make it nearly impossible for patients to go even moderate distances to see specialists. The VXR-12 *plus* digitizer allows patients whose diagnoses are difficult and who require a specialist consultation to be handled more quickly. Their family life and savings are not adversely affected by the need to travel to Yerevan.”

Zartarian said the VXR-12 *plus* also is being used to digitize films of all types — normal x-ray, CT, and MRI — taken in Yerevan. “Doctors in Armenia often need to consult with professors and specialists around the world, and they felt rather isolated due to the earthquake,” he said. “Digitization and telemedicine allow much more collaboration, and provide the opportunity to improve their skills. Upgrading of skills is difficult to accomplish when medical images cannot be electronically transferred among peers in learning environments.

“The VIDAR digitizer also allows clinicians to maintain electronic copies of x-rays on file at the diagnostic center,” Zartarian said. “Previously, when a patient was required to take the only hard-copy of an x-ray to the surgery facility or to Yerevan for a consultation, Diagnostica had nothing but a record of physician notes. Without an electronic version of the x-ray, it was not possible to compare historical x-rays, or to look again at an x-ray. Under these conditions, communication with the primary care doctor was hindered. Having the VIDAR digitizer significantly improves the ability to care for patients — it is both the heart and workhorse of the Armenian telemedicine system.”

Proven Performance Under the Most Difficult Conditions

In contrast to expensive laser digitizers, which require substantial routine maintenance and are prone to operating problems, VIDAR’s digitizers have a well-deserved reputation for high quality, reliability,

“Having the VIDAR digitizer significantly improves the ability to care for patients — it is both the heart and workhorse of the Armenian telemedicine system.”

—Dr. Sarkis Zartarian
President, Applied Communication Concepts

durability, and cost effectiveness. VIDAR’s film digitizers have demonstrated superior performance, even in the most difficult operating environments, and they require little or no maintenance. Engineered for reliability and durability, VIDAR digitizers are well suited for demanding teleradiology and telemedicine applications — from high-volume radiology practices and mobile radiology to military battlefields and disaster sites.

They also have been successfully deployed in more than 300 mobile radiology vans in the western United States — a true test of their ability to withstand shock and vibration. In this challenging environment, they have achieved an exceptional performance record. VIDAR’s digitizers also have successfully completed extensive shock and vibration evaluation, undergoing 40 hours of testing — the equivalent of 40,000 miles.

Applications in Nondisaster Situations

While the successful deployment of the VXR-12 *plus* digitizer in Armenia illustrates the benefits of VIDAR’s CCD technology in disaster situations, the availability of affordable, high-quality digitizers is of fundamental importance in nondisaster situations as well. The broader application of remote primary diagnosis to provide care in medically underserved rural and urban areas has the potential to significantly improve healthcare in the United States and around the world. In addition, the ability to provide more affordable radiology services through the use of remote primary diagnosis, as well as the important teaching and knowledge-sharing applications, may have an immediate and positive impact on the delivery of patient care.

Helping to advance the widespread use of remote primary diagnosis are new, state-of-the-art, affordable film digitizers that deliver the highest level image

quality. Recent clinical studies support the image quality claims of VIDAR s systems. A study conducted at the Johns Hopkins Medical Institutions, for example, compared the ability of clinicians to make accurate diagnoses using images digitized with VIDAR versus laser systems. Preliminary results indicate that there is no statistically significant difference between the perceived image quality of the two types of digitizers, and there is no statistically significant difference in the overall ability to make correct diagnoses from softcopy displays between the two types of digitizers. Other recent studies have obtained similar results. With the cost of VIDAR s digitizers about half that of laser systems, the expanded use of remote primary diagnosis to improve patient care is now feasible.

Conclusion

Emerging from the early telemedicine studies is the realization that medical networks, equipment, and other healthcare infrastructure must be in place and operational in order for disaster management to be quickly mobilized in crisis situations such as the earthquake in Armenia. In fact, NASA s work on the Telemedical Bridge to Armenia project showed that putting the telemedical infrastructure in place was a major challenge, and that a high-quality, reliable film digitizer was a key requirement. VIDAR s donation of the VXR-12 *plus* digitizer to the Armenian Telemedicine Project provided an important piece of that infrastructure and is already helping to improve the delivery of healthcare as the country struggles to cope with the decade-old crisis. The digitizer also is poised to play a key role in future crises in the area.

The VIDAR Family of Film Digitizers

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.



460 Springpark Place
Herndon, Virginia USA 20170
+1.703.471.7070
+1.800.471.7226
fax: +1.703.471.1165
filmdigitizer@vidar.com