



NEC MDVIEW MONITORS FOR THE HOSPITAL IN TROMSØ: PUTTING QA ON THE AGENDA

The **hospital in Tromsø** provides specialised medical services for the whole of Northern Norway, covering a population of 465,000. It additionally serves as a local hospital for the 130,000 inhabitants of the Tromsø area. When the management of the hospital decided to update its image-viewing monitors it had some very clear ideas about what it wanted. Yngve Skar tells how they integrated QA principles into the new system.

Tender and evaluation

By summer 2005, radiologists at the University Hospital in Tromsø, were only too aware that their image-viewing monitors needed replacing. Many had been acquired back in 1998, when the hospital's radiology department installed its Picture Archive and Communications System (PACS). So the department initiated a scientific selection process in a bid to find the optimum medical display solution.

Several companies responded to the initial call in June 2005 to make a tender, recalls Yngve Skar, responsible for QA throughout the radiology department. Some display offerings were clearly inappropriate. The remaining

bidders were invited to bring their systems to the hospital for a head-to-head comparison with their competitors.

Sample images for the test were taken from the University Hospital's existing digital archive of CT, MRI, and X-ray images. The selection was chosen to represent the wide spectrum of cases that radiologists at the busy 625-bed university hospital might be asked to interpret. Radiologists can consequently expect to see a diverse array of injuries, diseases, and infections on a weekly basis.

Several of the department's radiologists had been very keen to sit in on the evaluation, Skar says. However, their comments on image quality tended to be quite subjective. The radiologists' observations often related simply to how a particular case looked on a particular monitor. While these observations were no doubt salient, an overview of the systems' performance in relation to one another was required for a purchasing decision to be made.

To produce a more objective assessment, Skar rated each display in terms of the more general parameters that



For more information:
NEC Display Solutions Europe GmbH
Landshuter Allee 12-14
D-80637 Munich
Phone +49 (0)89 99 699-0
www.nec-display-solutions.com

All hardware and software names are brand names and/or registered trademarks of the respective manufacturers. All rights reserved. All specifications are subject to change without notice. October 2006.



make the difference to image-viewing quality; contrast, resolution, and brightness. This assessment was a little more complex than a straightforward 1–5 scoring system, he notes. Yet still a clear winner could not be found. Two or three vendors were deemed to have passed the test almost equally. “They were so close that it was difficult to say that one was better than the others,” he says. The final selection, then, came down to two additional criteria; price and functionality. Having identified a number of systems that would display medical images with sufficient clarity for radiological diagnosis, attention turned to the questions: “What can the department get for its money?” and “What added benefits do each of these systems bring?”

NEC MDview Series - 2 MP resolution for a perfect image-viewing

A decision was eventually taken to place an order with NEC Display Solutions for 22 dual-monitor workstations (44 screens). This comprised 38 19-inch colour monitors (NEC MDview19) with a resolution of 1MP, and six 21-inch monochrome displays (NEC MD21) with a resolution of 2MP.

The decision to purchase six higher-resolution monochrome displays was made with QA in mind. These 2MP workstations are generally reserved for more specialist musculoskeletal applications, where the extra clarity can be particularly helpful. “This was something that I specifically wanted. I wanted to have some displays with better resolution,” Skar says. “The radiologists wanted to have colour displays, but I think they like the resolution of the monochrome displays now that they see it.”

The six paired NEC MD21 displays each have NEC Display Solutions’ X-Light® technology. This controls and adjusts luminance and white point levels via an

integrated feedback sensor throughout the life of the monitor. In addition to reducing the need for calibration checks, the X-Light® technology is designed to alleviate backlight colour shift to the yellow spectrum. Other features incorporated with the NEC MD21 displays include fast switch gamma curves, black-level adjustment, ultra-thin frame design (bezel width 16mm), and an internal power supply. A 10-bit video card provides 1024 out of a possible 3061 grey shades, while an 8-bit card offers only 256 shades of grey.

Both types of display system come complete with a number of user-friendly features. The display screens are made from “Superfine TFT” glass, which offer a wide viewing angle of 176° and minimal off-angle colour shift. Use of round resin beads in the “Superfine TFT” inherently reduces glare. Reflections are kept to a minimum by the addition of a low reflection coating. The screens can be positioned in portrait or landscape mode, depending on users’ preference, and tilted to provide an optimum viewing angle. “This makes it more comfortable for whoever is looking at the images,” Skar notes. These ergonomic aspects were one factor that helped clinch the deal for NEC Display Solutions.

Two of the dual-head workstations were installed in radiologists’ offices. The remainder were setup in communal reporting areas for easy access by the

department’s radiology staff. “The radiologists started using them straight away,” Skar says. “They had been working with displays for several years, so soft-copy reading was nothing new to them. But of course the displays were better, so the quality of images they were viewing improved.”

QA efficiency

NEC MDview displays have built-in, standalone calibration tools, paired monitors can be swapped in and out, and recalibrated and re-matched whenever required. This means that if one half of a dual-head display system fails, it is not necessary to return the entire workstation. “Some vendors pair their displays so if there is a fault with one, you have to change both of them. With NEC Display Solutions, if there is anything wrong with one display, we just change that one and calibrate it again,” he says.

The display systems have also been loaded with NEC’s GammaCompMD calibration and conformance software. This QA tool ensures that individual monitors conform to current DICOM standards. It also offers the option of centralising QA management of multiple display systems. “The networking software of NEC Display Solutions makes it possible to sit at one workstation and get information from the displays, wherever they are, instead of going to a workstation and collecting information there. It is a more centralised way to work,” Skar says.



Prior to the software set-up, completed in November 2005, NEC Display Solutions personnel briefed medical technicians, IT staff, and QA management about its use. They additionally proffered advice on the importance of QA policy. This one-off session included information on the AAPM TG18 guidelines for QA of medical imaging displays. For instance, the AAPM TG18 has detailed the tools and procedures required for assessing parameters such as geometric distortions, reflection, luminance response, luminance dependencies, and resolution, to ensure they meet defined criteria.

Skar now intends to pass the QA message on to radiologists himself. While an “external voice” can help reinforce the need for QA control, doctors are busy and may resent having to attend such briefings. Inculcation of QA principles probably requires an inhouse approach, which can be pursued over a long time-period, he says. “This is not something that can be done in a day. It will take a while longer to get the message across.”

For information on products and services access www.hospitalhealthcare.com

“With the NEC MDview displays we ensure, that our diagnoses/interpretations conform to current DICOM standards ... it also offers the option of centralising QA management of multiple display systems”, says Yngve Skar, radiographer at the University Hospital of Tromsø.



see more.

NEC Display Solutions