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PATIENT SAFETY, RADIOLOGIST PRODUCTIVITY AFFECTED BY USE OF CONSUMER-GRADE DISPLAYS FOR DIAGNOSTIC IMAGE READING

Use of Consumer-level Displays Creates Concerns in Diagnostics

CHICAGO – March 16, 2010 – [NEC Display Solutions of America](#), a leading provider of [commercial LCD](#) display and [projector](#) solutions, today recommended that radiologists reconsider any plans to use consumer-grade LCD displays for primary diagnostic reads of patient scans.

Use of consumer-grade panels is on the rise due partly to the increase in teleradiology – where radiologists perform readings outside of their hospital, lab or office – coupled with hospital budgetary constraints. The trend can adversely affect both patient safety and radiologist productivity. NEC Display, which offers both varieties of displays, including DICOM-calibrated medical diagnostic displays, and professional- and commercial-grade LCD displays, suggests there are specific criteria important in evaluating displays for primary radiology reads.

According to the American College of Radiology, more than 70 percent of radiology errors are perceptual (Footnote No. 1: See http://www.acr.org/MainMenuCategories/about_us/committees/ethics/SurvivalStrategiesorRadiologyDoc20.aspx), meaning a failure to perceive a radiographic abnormality. Such errors can impact patient care and raise the risk of liability. Ability to see radiographic abnormalities can be directly linked to the diagnostic display's ability to show small

details, display an adequate range of shades of gray and produce a uniformly bright image. This is especially critical for imaging modalities such as digital X-rays and mammography, which require displays with native resolutions of 3-megapixels and 5-megapixels, respectively. Beyond resolution specifications, medical displays also incorporate superior electronics with longer-life components and features important to image quality like the ability to calibrate to the DICOM curve, uniformity correction to address issues inherent in every LCD panel and 12-bit gamma lookup tables for finely detailed, accurate renderings of delicate shadings.

Overall, LCD display technology has improved in quality over recent years, and resolutions and picture quality can appear to be good enough for diagnostic work on many of the consumer-grade displays available at retail stores. However, the tradeoffs are substantial and warrant scrutiny.

Part of the analysis includes return on investment (ROI), which is improved with medical-grade displays, because typical product life is four times greater than that of COTS (commercial off-the-shelf) displays.

Calibration also impacts ROI because medical-grade displays include integrated front sensors and backlight sensors to automatically hold DICOM calibration steady over time. All LCD backlights lose luminance over time, fading 5 percent over the first 100 hours and 10 to 15 percent over the first 1,000 hours.

Therefore, when displays are equipped with self-correcting sensors, the displays can avoid frequent calibration at the expense of time and manpower. In addition, the ROI of medical-grade displays is better due to longer warranties, which in some cases include overnight replacement.

“Many radiology departments are now considering COTS displays for diagnostics due to budgetary considerations,” said Stan Swiderski, Business Development Manager for Professional/Specialty/Medical Displays at NEC Display Solutions. “But most COTS displays will not pass muster for diagnostic reads, even if these displays look good on first evaluation. Lesser-grade panels exhibit color shift at off-angle viewing, which can impact interpretation. In addition, most diagnostic displays are used in portrait orientation,

which in most COTS displays will reduce the life of the display as well as cause the images to appear blotchy due to poor brightness uniformity.”

Elizabeth A. Krupinski, Ph.D., Research Professor in the Department of Radiology at the University of Arizona, discovered that there was a statistically significant difference between medical-grade color displays and COTS color displays, with the former yielding higher diagnostic accuracy (Footnote No. 2: See <http://www.springerlink.com/content/p5082140hx211q52/>). The research found that total viewing time did not differ significantly, but eye position data revealed differences, suggesting better search and decision-making efficiency with the medical-grade displays.

“COTS displays today are certainly superior to what we started out with when we made the move from film to digital, but they are not equivalent to today’s medical-grade displays,” said Dr. Krupinski.

However, there are also many COTS displays of superior quality that serve medical professionals well for secondary reads or clinical reviews, as well as low-resolution images like Doppler Ultrasound. One way to distinguish these higher-quality COTS displays is to look for DICOM-calibration capability.

“NEC offers its MultiSync® MD Series of diagnostic displays used for primary reads, as well as the professional-level MultiSync 90 Series, MultiSync P Series and MultiSync PA Series models, which are often used for secondary reads or clinical reviews when calibrated to DICOM settings,” said Art Marshall, Product Manager for NEC Display Solutions. “In our role as technology evangelist, we simply want to make sure radiology departments are giving the differences adequate thought and making good decisions during procurement.”

To learn more about these issues, please join NEC Display Solutions for a Webinar on March 23. Registration details are available at <https://www1.gotomeeting.com/register/670830873>

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