AbstractID: 1720 Title: Image Quality and Object Detection Variation with Viewing Angle on CRT and LCD Displays

The effect of viewing angle (0 to 45 degrees) on display performance and object size detectability was evaluated on a Siemens SMM21201P 5 MegaPixel CRT, a 9.2 Megapixel IBM Hi-brite T221 flat panel and a 9.2 Megapixel IBM Hi-brite T221 flat panel. Measured display parameters included D_{max}, D_{min}, contrast ratio and luminance uniformity. A Minolta LA-100a spot meter was used to measure luminance of three targets (each 3% of total display area) vertically aligned along the central axis of each display. The target surround was either 0 or 20% of D_{max}. Top, Middle and Bottom central axis measurements were taken. CRT angular variation of D_{max} and D_{min} luminance levels varied between 20 – 25% while there was no variation in contrast ratio. LCD angular variation D_{max} and D_{min} luminance levels varied between 50 – 60% with a 35 – 45% variation in contrast ratio. Vertical positional variations were also noted.

The effect of viewing angle on object size detection was measured using an 11x11 array with sub-elements that had center targets and a correspondingly sized target in one of the four corners. The targets were pixel matrices ranging in size from 4x4 to 15x15. The background to target difference for the sub-elements varied from 1 to 11 driving levels. Five readers evaluated the pattern at viewing angles ranging between 0 and 45 degrees. As viewing angle increased, the K-value (smallest object size x contrast) increased. These quantitative measurements of decreased object size detection will be discussed.