

AbstractID: 11723 Title: An Efficient Method for Image Quality Analysis of the On-Board Imager®.

Purpose: To develop a quality assurance procedure to test image quality of a kilovoltage On-board Imager system (On-Board Imager®, Varian Medical Systems, Inc., Palo Alto, CA). **Method and Materials:** An imaging phantom (TOR 18FG, Leeds Test Objects, Ltd.) was used to analyze kV imaging quality. The phantom includes 21 line pairs (0.5 – 5.0 lp/mm) and 18 low contrast discs. An image of the phantom was taken weekly using 70kV, 40mA, and 100ms. The images were analyzed using the ImageJ software package (U.S. National Institute of Health, Bethesda, MD). A macro detects the circular edge of the phantom and performs a least squares circle fit to detect any translational shift in the phantom. ROIs are automatically selected and mean and standard deviation are measured. An interface to our in-house quality assurance database was developed. The database calls the macro, receives the measurement results and calculates noise, contrast scale and MTF of the image. Low contrast is resolved by taking the difference between the mean of the low contrast discs and areas adjacent to them. Visibility is determined by a minimum difference. The database stores analyzed data and graphs results over time. **Results:** Images were acquired between October 2008 and February 2009. Images were exported from the R&V system and were typically analyzed in under a minute. The software was tested by introducing additional specific noise to the images using ImageJ. Using the software, we were able to track MTF, contrast scale, and noise over time and confirm the imaging quality of kV imager. **Conclusions:** This work demonstrates an efficient way to perform weekly quality assurance for on-board kV imagers.