AbstractID: 2053 Title: Investigation of exposure modulation methods for Scanning Equalization Digital Radiography (SEDR).

Objective: To report on the progress of our development and investigations of exposure modulation methods for use in scanning equalization digital radiography (SEDR).

Method: SEDR combines slot scanning imaging with exposure equalization achieved by independently modulating the fan beam width in 24 separate segments. 41 slot collimated images of an anthropomorphic chest phantom were acquired with a digital chest radiography system. The resulting images were digitally segmented and corrected for scatter outside and inside the fan beam, respectively, and combined into a primary only image. This image was smoothed and used to compute the beam width modulation signals and the resulting equalizing exposure profile. The latter was compared to the intended exposure profile to evaluate the accuracy of beam modulation. The development and evaluation of a second approach using regional beam attenuation to control the exposure is also in progress.

Results: We have found that beam width modulation can effectively generate exposure equalized images in SEDR. However, the actual equalizing exposure profile was slightly shifted with respect to the intended profile with the difference depending on the exposure gradient, slot width and the edge used for beam width modulation. This shift could be partially compensated for by properly delaying the beam width modulation signals. We have estimated and optimized the beam width modulation signals and use them to guide our design of the beam width modulator system.