AbstractID: 13182 Title: Study of the perception of microcalcification clusters in stack-mode digital breast tomosynthesis

Purpose: To observe human performance in viewing Digital Breast Tomosynthesis (DBT) images of microcalcification clusters (MCs) in stack-mode. **Method and Materials:** A GUI program was created to simulate the presentation of DBT images in stack-mode. The background consisted of either a uniform gray screen, a gray screen with varying amounts of Poisson noise, or simulated breast images. Each image had an average intensity value of 128, and was displayed for a total of 6 seconds. After the first 4 seconds, a MC at a specified radius from the center was shown for 1 second. The MCs were simulated after those found in the ACR mammography accreditation phantom. The radii used were: 540, 360, and 180 pixels. Contrast differences between the MC and the background were chosen randomly from a set range of about 10-35 gray values. Three test subjects were asked to look at the center of the screen, and to click where they saw a MC in their periphery after the images were displayed. The angular error of the response was calculated, and served as a measure of detection accuracy. A monotonic fit was applied to the data. **Results:** As contrast of the MC increases, the probability of detection increases, and the angular error decreases. With increasing radius from the center, the threshold contrast for detection increases. Similarly, as the Poisson noise in the image increases from a factor of 1 to 4, the threshold contrast for detection increases. Abnormalities that appear in the right and left sides of the screen have a lower angular error than those that appear in the top and bottom of the screen. **Conclusion:** These data provide insight into how radiologists perceive MCs while viewing DBT images in stack-mode. Findings about peripheral vision may suggest a more optimal way of displaying DBT images.