AbstractID: 5957 Title: Design and Performance Characteristics of Flat-Panel Acquisition Technologies

Flat-panel detectors are becoming more commonplace throughout the world for numerous applications ranging from mammography to megavoltage imaging and from static projection radiography to real-time fluoroscopy and cone beam CT. A detailed understanding of their advantages and limitations is essential to ensure their efficient integration into the clinical environment. This presentation will review their place in the current DR detector landscape and the unique features that provide them with their improved image quality performance when compared to other approaches. The differences and similarities between the various flat-panel designs will also be discussed with a view to highlighting their inherent image quality capabilities as well as some practical limitations to their performance. The process of gain/offset corrections will be reviewed and the issue of bad pixels, defective lines and image artifacts commented on. The implications of certain gain calibration procedures will be reviewed in terms of the possibility of image artifact creation, in particular in terms of other system components such as anti-scatter grids and AEC circuitry. The impact of non-linear behavior and pixel saturation will also be reviewed. In conclusion the development of advanced imaging applications such as dual energy, tomosynthesis and cone-beam CT will be reviewed.

Conflict Of Interest: John Yorkston is an employee of Eastman Kodak Company which sells DR systems based on CsI(Tl) type Flat-Panel detectors.

Objectives:

(1) Review the range of DR and flat-panel detectors currently available and their design and performance differences.
(2) Review the process of gain/offset calibration and its benefits and limitations.
(3) Review the impact of pixel and line defects, correlated line noise, pixel saturation and other characteristics behaviors of flat-panel detectors.
(4) Review the prospect of advanced applications utilizing flat-panel technology.