AbstractID: 12935 Title: New Graphical User Interface for the Solid State X-ray Image Intensifier (SSXII)

Purpose: A new Graphical User Interface (GUI) was developed and implemented using Laboratory Virtual Instrumentation Engineering Workbench (LabVIEW) for a high-resolution, high-sensitivity SSXII, a new x-ray detector for radiographic and fluoroscopic imaging.

Method and Materials: The new SSXII consists of an array of Electron Multiplying Charge Coupled Devices (EMCCDs). EMCCDs are enhanced CCD image sensors with a unique feature that includes variable on-chip signal amplification of up to 2000 times. These low-noise light sensors view an x-ray phosphor through a fiberoptic taper used to enlarge the field of view (FOV). An array of such modules has been built to further extend the FOV. The initial 1×2 array includes two identical EMCCD cameras connected to a National Instruments (NI) PCIe-1430 dual-channel Camera Link PC board. A new GUI was developed and implemented using LabVIEW for camera control, image acquisition, and to provide a variety of clinically-relevant functions.

Results: The GUI provides a user-friendly interface that includes patient registration functionality and acquisition control to save 2k×1k images at a rate of 17 Hz (or faster with pixel binning). The parameter sets of each camera, including control of exposure time, trigger mode, and EMCCD gain, can be modified during imaging runs. An additional window allows the user to control all of the other camera parameters, which can be subsequently saved to a text file for reference. Initial 1x2 EMCCD camera array will be expanded to provide even larger FOVs.

Conclusion: The control and acquisition capabilities provided by this GUI, along with the variable electron-multiplication gain, high-resolution, high-sensitivity, and real-time imaging capabilities of the new expanded-FOV SSXII should provide angiographers and interventionalists with an improved ability to visualize details of small vessels and endovascular devices, making diagnoses and image-guided interventions more accurate.

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