

AbstractID: 12956 Title: The Upgraded Control, Acquisition, Processing, and Image Display System (CAPIDS) for a Micro-Angiographic Fluoroscope (MAF)

Purpose: The Control, Acquisition, Processing, and Image Display System (CAPIDS) for the Micro-Angiographic Fluoroscope (MAF) has been upgraded and is being evaluated for hospital clinical use.

Method and Materials: The CAPIDS was developed and implemented using Laboratory Virtual Instrumentation Engineering Workbench (LabVIEW) and provides a user-friendly interface that enables control of several clinical radiographic imaging modes of the MAF, including fluoroscopy, roadmapping, radiography, and digital-subtraction-angiography (DSA). The MAF is a high-resolution, high-sensitivity, real-time imager which consists of a 300 μm -thick CsI phosphor, a dual-stage micro-channel plate light image intensifier (LII) coupled to a fiber-optic taper (FOT), and a frame-transfer CCD camera, providing an image matrix of 1024×1024 35- μm square pixels with 12-bit depth. The region-of-interest (ROI) MAF can be inserted in front of a standard large field-of-view, standard-resolution flat-panel-detector (FPD) using a detector changer when higher resolution is needed during angiographic or interventional vascular imaging procedures. Several new features were added to CAPIDS including: saving DSA images as the mask for Roadmap mode, LII gain-drift correction, direct saving of patient images, and real-time window/level correction.

Results: The upgraded CAPIDS has been used effectively for image guidance in over 10 rabbit aneurysm creation and treatment experiments, demonstrating the system's potential benefits for future clinical use. The CAPIDS controlled MAF increases the resolution of the x-ray image compared to a conventional FPD and thus should increase the accuracy of interventional procedures.

Conclusion: The upgraded CAPIDS for the MAF was modified and used in pre-clinical interventional experiments. This upgrade enables the CAPIDS-MAF imaging system to perform in most common clinical x-ray imaging modes including: fluoroscopy, roadmapping, radiography, and DSA. The system is being evaluated for adaptation into a hospital-based clinical interventional suite.

(Supported by: NIH Grants NIH Grant R01NS43924, R01-EB002873)