AbstractID: 10714 Title: New High-Resolution Detector Changer for a Clinical Fluoroscopic C-Arm Unit

Purpose: To investigate a means to alternate image acquisition between a high-resolution region-of-interest (ROI) detector and a standard flat-panel detector (FPD) when used for neurovascular image-guided interventions with a clinical fluoroscopic C-arm so that the larger area detector could be used during initial parts of a procedure and the high-resolution detector used during critical parts of the intervention when better images are needed.

Method and Materials: A new detector changer was designed, fabricated, and mounted on a clinical fluoroscopic unit to allow a ROI detector such as the Micro-Angiographic Fluoroscope (MAF) or Solid-State X-ray Image Intensifier (SSXII) to be introduced in front of the standard FPD to enable high-resolution fluoroscopy, DSA, and cone-beam computed tomography. The x-ray collimation automatically adjusts the field-of-view (FOV) when the changer inserts or retracts the ROI detector so that the correct FOV, smaller for the ROI detector or larger for the FPD, respectively, is implemented. A touch sensor at the front of the ROI detector holder causes the entire imaging unit (FPD and ROI detector) to retract upon physical contact in order to avoid collision with a patient or other objects on or near the table.

Results: The new detector changer has been installed onto a Toshiba Infinix clinical fluoroscopic C-arm unit. The changer provides stable support for the ROI detector, allowing operator selection of high-resolution ROI or standard FPD. The collision avoidance and automatic collimation features have worked reliably during laboratory evaluation and should provide a patient-safe imaging capability.

Conclusion: The new detector changer mounted on a commercial clinical fluoroscopic C-arm unit provides a safe and rapid means to exchange imaging detectors to accommodate the resolution requirements of angiographic and interventional vascular imaging during the course of a procedure.