

AbstractID: 1513 Title: LabView Algorithm for Control of Cone Beam Micro-CT Machine

High resolution cone-beam micro-CT is one of the best methods for studying small animals or test objects. We built a computer controlled micro cone-beam CT machine using a micro-angiographic detector developed by our group, an x-ray micro-focal spot tube, and a stepper-motor-driven rotary stage. Continuous x-ray exposure from the x-ray tube is transmitted by a custom made shutter during image acquisition. The x-ray detector is a 1kX1k camera which has a CCD coupled to a phosphor through a fiber-optic taper. We wrote a LabView program which controls the acquisition and the cone beam CT reconstruction using standard LabView device libraries for the camera, the x-ray tube, and the rotational stage. The algorithm has the following features: almost instantaneous offset and gain corrections, window and level adjustments, automatic reconstruction and display. The algorithm itself has two main bodies: one for acquisition and the other for reconstruction. The acquisition part is written using a LabView sequence diagram which can be split into four major steps: initialization, exposure and acquisition, image correction and storage and finally, rotation of the object. The exposure times per acquisition can vary depending on the object being imaged, from 50 ms to 1 second. The LabView Graphical programming environment provides a flexible and high level programming method to implement a complex control algorithm for cone-beam acquisition processes and reconstruction. Support received from NIH Grant 1R01EB002873 and the University at Buffalo STOR.