AbstractID: 1315 Title: Integrated Full-Field Digital Mammography and 3D Breast Ultrasound System

We report on the development of an integrated 3D ultrasound and full-field digital mammography scanner with simultaneous x-ray and ultrasound acquisition capability. Since the x-ray system uses a slot-scanning detector, we integrate an ultrasound transducer onto the x-ray scanning mechanism. Both modalities scan under the breast during a single compression, and therefore share the same coordinate system. Through simulation and empirical results we verify that integrated system does not degrade x-ray or ultrasound image quality. Using a custom-made dual-modality 3D grid phantom, consisting of three layers of wire meshes of know exact spacing, we determine that our co-registration acquisition accuracy is within 2.0 mm in the scan direction, and within 0.5 mm in the anterior-posterior direction. We also acquire co-registered images of a multi-modality anthropomorphic breast phantom. These preliminary results demonstrate the complementary capabilities of x-ray and ultrasound, and illustrate the value of the integrated system. Ongoing efforts aim at stricter co-registration requirements, image quality assessment and integrated image display. Supported by NIH grant 1 R43 CA100959-01.