A new x-ray imaging principle called Variable Resolution X-ray (VRX) detection allows the detector's modulation-transfer function (MTF) to be improved by several orders of magnitude over that normally obtained for computed tomographic (CT) or digital radiographic (DR) imaging. When operating in the CT mode with suitable x-ray focal spot size, the VRX spatial resolution is matched to the subject size. Thus, if a 50 cm field yields 2 cy/mm resolution, a 1 cm field may yield 100 cy/mm resolution.

The first experimental tests were made with a 16-channel array (United Detector Technologies) comprising individual $CdWO_4$ scintillators interfaced to a photodiode array and read out with a 16-channel MicroDAS (Analogic Corp). MTF measurements made with this array exhibited limiting resolution of 64 cy/mm

The VRX principle was also tested in the high-resolution CT imaging mode. A 750μ-thick fan beam passed through small specimens (typically, 2-8 cm diameter fields) mounted on a rotating table. The VRX detector employed a storage phosphor screen that was scanned vertically to record the CT sinogram. Projection resolution of 20 lp/mm was measured with a lead bar pattern.

The storage phosphor was read out by a laser scanner and the sinogram, after corrections were applied, was separated into individual projections (views). The views were further aligned, convolved and back projected to yield the CT image of the subjects. Images have been made of a plasticized human forearm section, an anesthetized hamster, a resected human finger and mechanical objects.