The x-ray detector system is fundamental to the performance of digital mammography. The basic principles of detector operation will be reviewed including the factors contributing to spatial resolution, signal-to-noise ratio and dynamic range. The techniques and measures for detector performance evaluation will be discussed and a semi-automated approach to the measurement of some of these descriptors will be presented.. The accuracy of the current clinical digital mammography systems is being evaluated versus screen-film mammography in the DMIST study on 49,500 women, conducted through the American College of Radiology Imaging Network (ACRIN) at 19 study sites in the US and Canada. The study and its progress to date will be described. The full impact of digital mammography is likely to become most apparent through the ancillary imaging applications that are facilitated by having high quality images in digital form. Some of the existing and emerging applications, such as CAD, telemammography, contrast uptake imaging, tomosynthesis and risk prediction through breast density analysis will be discussed.