Since its introduction into diagnostic radiology in 1981, storage phosphor plate technology has become the dominant method for acquiring digital radiographs. This talk will review some of the recent technological advances in storage phosphors and in imaging systems based on this mode of acquisition.

Following a historical review and a brief tutorial on the basic physics, we will focus on recent developments. Among the newer phosphors that will be discussed are $RbBr:Tl^{+}$ and $CsBr:Eu^{2+}$. Unlike conventional powder phosphors, these phosphors are deposited on the imaging plate substrates by thermal vapor deposition. $CsBr:Eu^{2+}$ can be grown in needle-shaped crystals (similar to CsI:Tl) which has a number of advantages for imaging performance over powder phosphors.

The next generation of image plate readers will feature improvements in image quality, scanning speed and workflow. One reader implementation collects photostimulated emission from both sides of the storage phosphor plate, thus offering the potential for improved detective quantum efficiency. Another novel approach is an imaging plate reader that uses a line scanner (as opposed to the flying spot approach) to reduce scan time. The linear scanner can be miniaturized to fit inside a special cassette, creating a self-scanned digital radiography solution that can be incorporated into fixed radiographic tables and wall stands.

We will examine recent advances in image processing, including segmentation, auto-ranging and enhancement. Several manufacturers had developed systems featuring advanced applications such as dual-energy imaging, tomographic artifact suppression, mammography, full-leg and full-spine imaging, automatic quality control and radiation dose monitoring. Storage phosphor technology deployment has expanded beyond general diagnostic radiology and into areas including dental radiography and bone mineral densitometry.

Workflow optimization is of keen importance in busy clinical environments, and commercial vendors have responded with system-oriented approaches that can be configured to meet the requirements of the institution. We will review both centralized and decentralized solutions for merging patient demographic information with image data, performing quality control, and routing images to distributed destinations for interpretation.

(The authors are employees of Agfa.)

Educational Objectives:
1. To review the history and basic principles of storage phosphor radiography.
2. To compare next generation storage phosphors to the current state-of-the-art.
3. To examine recent advances in image plate scanners.
4. To review developments in image processing, advanced applications and workflow optimization.