Digital Radiography: Review of current commercial offerings

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Conflict of Interest Disclosure

• Consultant to Agfa Healthcare
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Digital radiography: Historical timeline

• 1980’s: powder phosphor cassette-based CR (storage phosphor) systems

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- 1990’s: integrated, high-throughput cassette-less CR systems
- 2000’s: electronic DR detectors

What’s currently available?

Traditional cassette-based CR systems
Advanced cassette-based CR systems

- Structured phosphor (CsBr)
- Line scanning
- Dual-side reading

Fuji “DR” Velocity SpeedSuite

- They call it “DR” but ....
- It’s really stimulated emission (storage phosphor) technology
- CR image capture, integrated and synchronized with x-ray generation system
Fujifilm “DR” Velocity Unity

HD LineScan Technology
For image acquisition, the Fujifilm DR VELOCITY Unity uses a revolutionary HD LineScan technology with an imager a single CCD set to a dynamic sensor. The detector size is significantly smaller than previous models yet has an increased throughput rate, allowing images of a high resolution of 384x640.

Fuji “DR” Velocity T (table)

Removable IP / scanner assembly

Fujifilm “DR” Velocity Unity fp

fp = focused phosphor (not flat panel)

Fujifilm “DR” Velocity T fp
Fuji FCR XU-D1

- 43 x 43 dual-side IP
  - Thicker phosphor layer
  - Higher DQE
- Energy subtraction

Canon DR Detectors

Indirect flat panel DR detector

courtesy of Philips

Fully integrated DR Room

(Philips)
Swissray
• Indirect capture DR technology
• CCD or Indirect FPD

GE Digital Radiography

Siemens Digital Radiography

Fuji AcSelerate
Fully integrated & highly automated DR room, a-Se FPD
Wireless DR cassette

- Wired or wireless DR
- Irradiation side sampling (ISS)

(Canon)

Wireless DR cassette

(Konica-Minolta)

Wireless DR cassette

(Fuji)

Fuji Irradiation Side Sampling (ISS)

(Fuji)
Advanced applications

• Conventional linear tomography
  – CR & some DR (long exposure time)
• Dual energy subtraction
  – CR (single exposure with dual screens)
  – DR (kVp switching, rapid readout - 200 ms)
• Tomosynthesis
  – DR (rapid readout)
Conclusion

- Stimulated emission storage phosphor cassettes — still have a role in digital radiography
- Cassetteless CR and DR — enable high patient throughput, faster workflow
- Advanced SP and FPD design — increased DQE, better imaging performance
- Fast readout DR detectors — advanced applications, e.g., tomosynthesis and DE
- Wireless cassette-based DR detectors — These advantages, plus bedside use and backward compatibility

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