

GEMini™



The C-RAD GEMini imaging system is based on technology invented at the Karolinska Institute and CERN. The gas filled sensor unit contains a buildup layer where high energy photons are efficiently converted to electrons and then amplified through a Gas Electron Multiplier (GEM). The electrons are then transported to the pixelated readout by an electrical field and a 2D image is formed by collecting the charge from each pixel.

The GEMini technology provides the following key benefits compared to previous generation flat panel detectors:

- Superior radiation hardness
- Dose rate independence
- Dose linearity
- Zero ghosting

The GEMini detector system is available in different configurations depending on the energy range of the application (kV or MV).



Technical Specifications: GEMini

Sensor:

C-RAD's Patented GEM*-based sensor using a metal converter and GEM technology in an Ar-Xe gas filled chamber at atmospheric pressure.

Active Area: 40 cm x 40 cm

*Gas Electron Multiplier, licensed from CERN

Electron Collection and Readout:

2D Image Matrix: 886 x 886 direct electron pick-up TFT panel, 450 μm pixel pitch

Max. Bad Pixels: < 1 %

Charge Integration: 16 x 128 channels ASIC with selectable gain

ADC: 16 x 16 bit A/D at 6 MSPS

Min. Integration Time: 25 ms

Detector Specification:

Detector Housing: 67 cm x 59 cm x 4.4 cm

Weight: 25 kg

Frame Rate: 20 frames per second

Energy Range (MV): 1 MeV – 50 MeV

Energy Range (kV): 50 keV – 200 keV

MTF: F50 > 0.4 lp/mm at a typical 6 MV accelerator spectrum

Accelerator PRF: 25 to 1,200 pulses per second, opto-coupled external trigger input is available for accelerator synchronization

Image Lag: Not applicable due to the direct electron pickup, i.e. no light conversion or trapped charge induced effects

Cooling: Air cooling

Image Export: Images can be delivered as raw data, offset corrected and flat field/gain calibrated. The calibration data, the offset data and the bad pixel map can be exported. System commands and image data are transferred using a Gigabit Ethernet interface. Other interfaces are optionally available.

Imaging Software:

Application programming interface (API)

An interface (windows DLL) with basic functions for communicating with the Detector System is included, with functions such as image acquisition, updating calibration data, Detector System status and maintenance.

Works in progress. Not for sale in the US.

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