RMD RadCam™
Spectroscopic Gamma-Ray Imaging System

APPLICATIONS
- Nuclear Power
- Special Nuclear Materials, Spent Fuel Rods
- Homeland Security
- Site Assessment
- Decommissioning, Decontamination

FEATURES & BENEFITS
Detects gamma radiation. The pin-hole collimator, the coded-aperture collimator, and user-set data acquisition time give the system a wide range of sensitivity to gamma radiation.

The RMD RadCam shows the location of radioactivity and a spectrum of the detected gamma photons. This spectroscopic feature helps the user identify the presence of gamma-emitting isotopes such as $^{241}$Am, $^{57}$Co, $^{99m}$Tc, $^{235}$U, $^{239}$Pu, $^{131}$I, $^{137}$Cs and $^{60}$Co.

The mask, anti-mask position of the coded-aperture collimator enhances nuclear image quality by reducing background gamma events that do not correlate with gamma sources located in the nuclear camera's gamma-radiation field-of-view.

The system is constructed for field use and includes a rugged laptop computer.

- Assess sites remotely
- Reveal unknown gamma activity
- Localize hot spots of gamma activity
- Determine, by their spectra, isotopes that may be absent or present
- Reduce exposure to employees
- Monitor distribution of activities

The RMD RadCam™ makes images of gamma radiation superimposed over a black and white video image of the same field of view. The intensity of the gamma radiation is presented in color with progressively brighter colors corresponding to higher gamma activity. In addition, spectra showing the isotopes present are shown for user-selected areas of the image.

The main window (above) of the RMD RadCam™ Imaging System shows two $^{57}$Co gamma ray sources, each approximately $4 \times 10^8$ Bq activity. Sources were apparent in 2 minutes with the camera at 40 meters from the building.

Spectrum from RadCam™ system shows the 662 keV photopeak from $^{137}$Cs source located in center of video image. Image acquisition time was 60 seconds, coded-aperture double routine, and 2 meter distance to the 19 MBq (514 μCi) activity $^{137}$Cs source. Nuclear image has a signal-to-noise ratio well over 10:1 (average of 132 counts/pixel in the image peak, average of 5 counts/pixel outside the image peak).
RMD RadCam™

STANDARD SYSTEM

- RMD RadCam™ Camera
- Coded-Aperture Collimator
- Pin-Hole Collimator
- Ruggedized, Lap-Top Computer
- Data Interface Box
- RMD RadCam™ Software

- Coded-Aperture Collimator provides greater number of events in spectrum.
- Coded-Aperture Collimator with coded-aperture double routine reduces non-image gamma photons.
- Pin Hole Aperture quickly localizes gamma sources. Useful also in highest intensity gamma fields.

PERFORMANCE

Gamma Energy Range
Less than 30 keV to greater than 1.5 MeV.

Sensitivity
A nuclear image with a signal-to-noise ratio of 10:1 easily reveals unknown sources. Coded-Aperture double routine produces a sharp image (image signal-to-noise ratio of over 20:1) from 19 MBq (514 μCi) 137Cs source at 2 meters in 60 seconds.

Dynamic Response
Single Image better than 10:1 SNR.

Activity Dynamic Range
Less than 3.7 x 10⁸ Bq to more than 3.7 x 10¹¹ Bq.

System Field-of-View
Data acquired simultaneously from all points in field-of-view. Nuclear Zoom.
Coded Aperture Wide 40°/Narrow 20°.
Pinhole Aperture Wide 40°/Narrow 20°.

Nominal Time-to-Image
2 min with CA and 3.7 x 10⁸ Bq point source at 40 m.

Image Interval
4-mode. Counts, Time, Either, Both in the image.

GENERAL

Detector
Position-Sensitive Photomultiplier Tube.

Scintillator
Sodium-Doped Cesium Iodide (CsI(Na)).

Aperture
Sintered Tungsten Coded Mask or Tungsten Pinhole.

Operating System
Windows® XP.

Control Software
RMD RadCam™ software. Rapid, real-time image display and processing. MS Windows file handling, naming, saving and sharing.

Store entire data sets, spectra and images. Recall previous data sets and analyze images.

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