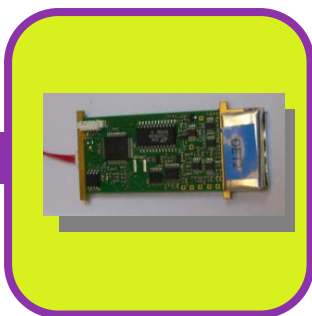


MGS Series Miniature Gamma Spectrometer Prototype



SYSTEMS DEVELOPMENT
& SOLUTIONS



Patented – Under licence from the French “Commissariat à l’Energie Atomique” (C.E.A.)

Instrument designation	The device is a miniature gamma spectrometer . It belongs to the Radionuclide Identification Devices category and measures the distribution of the intensity of Gamma radiation in order to reliably identify radioisotopes.	
Detection Principle	The spectrometer detector is a CZT semi-conductor. When irradiated, electron-hole pairs are created in the material, producing a current. The energy collected at the detector output-is proportional to the energy lost by the radiation in the collision. With a proper calibration, the spectrometer will deliver a spectral decomposition of the energy levels existing in the radiation, which characterizes the emitting element.	
Embedded electronic modules	<i>Detector</i>	<i>Rechargeable battery</i>
	<i>Pulse processing electronics : Preamplifiers, amplifier, converter, analyzer</i>	<i>HV module</i>
	<i>Memory (Flash and SDRAM)</i>	<i>Communication module</i>
	<i>Microprocessor</i>	<i>Radioisotope identification software - V2</i>
	<i>Real-time clock</i>	<i>Display - V2</i>
Major applications	Used for radionuclide identification and distinguishing between sources of radiations such as naturally emitting materials, medical isotopes, industrial sources, weapons-grade nuclear materials... The system is ideal for use in nuclear environmental monitoring, custom inspection, radioactive waste assay, characterization of nuclear accidents, battlefield environments...	

A unique combination of new technology, high performance and portable lightweight architecture

Miniature electronics

Leveraging CEA experience in detection electronics and SDS experience in miniature high voltage electronics, the electronic part of the CZT detector (V1) weights 20g and measures 75 x 40 mm



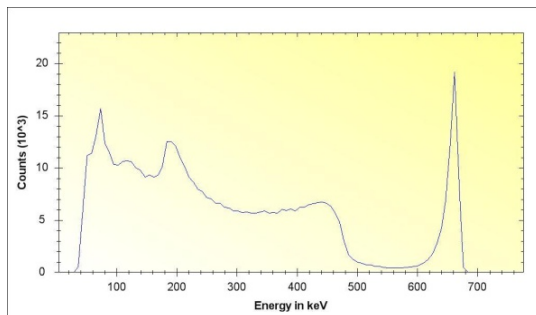
Emerging CZT detection technology

Cadmium zinc telluride (CZT) crystals have been the focus of numerous studies in the past decade due to their unique properties that make them attractive for portable room temperature nuclear detection applications (efficient and compact, excellent energy resolution of gamma rays, tolerance of temperature variations...)

Other technological features

- The device consumes very little power allowing all sorts of mobile application
- The first version of the device (V1) has a very high performance / cost ratio due to the association of high performance detector and simple electronics (no analysis software embedded). It enables the development of new mobile and embedded applications
- A second version (V2) of the device will embed radionuclide identification software and will enable fully autonomous application
- Open communication standards enable the device to work with any software suite
- The analysis chain features a specific signal correction software to compensate the crystal time/amplitude distortions

SPECIFICATIONS



137Cs spectrum with a CZT 60 mm3



Embedded experimentation

NUCLEAR

Emitter	Gamma
Detector	CdZnTe quasi-hemispherical detector
Detector Volume	<60 mm ³ to 500 mm ³
Energy resolution	6.7 keV at 662 keV
Energy range	10 keV to 3 MeV
Display	Provided by host instrument or PC

ELECTRICAL

Power	Supplied by PC (USB) or Battery
Battery life	Up to 10 hours of battery autonomy

MECHANICAL

Dimensions	75 x 40 mm (2.9 in. x 1.57 in.) (L x D)
Weight	20 g (0.044 lb)

ENVIRONMENTAL

Temperature	0 °C to +40 °C (32 to +104 °F)
-------------	--------------------------------