CAEN SyS

Systems and Spectroscopy Solutions

SPECIAL NUCLEAR MATERIAL PORTABLE IDENTIFIER

SNIPER-GN

OPERATIVE SCENARIOS

SNIPER-GN can be deployed for:

- Radioactive, SNM and NORM sources search, identification and mapping in harbor's containers area or for customs inspections
- Preventive and early warning detection in public access areas suitable for terroristic threats like dirty bomb and silent source
- Law enforcement by customs inspectors with masked source identification
- Personnel and Site Security in critical infrastructures
- Undercover orphan source searching in public events

MAIN FEATURES

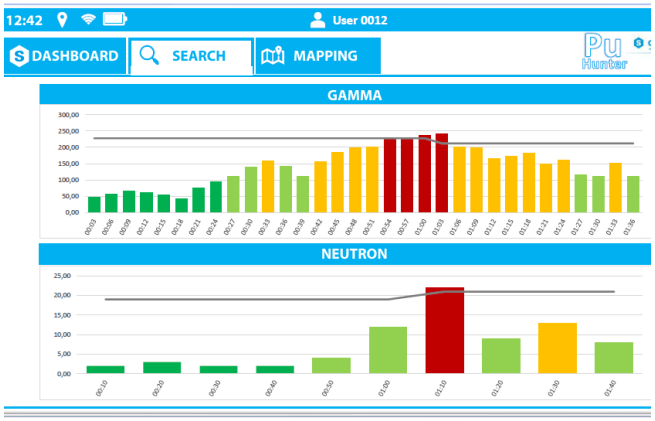
- Detection, localization and quantification of radioactive materials as Special Nuclear Materials (SNM) or Radiological Dispersal Devices (RDD)
- Gamma and gamma/neutron radiation detection and discrimination devices
- Neutron source ID with discrimination between fissile material, alpha-n source and plutonium
- Online pulse shape discrimination
- $CeBr_3$ scintillator detector for gamma spectroscopy
- Identification of gamma ray emitters and NORM sources
- Battery powered
- Compact, rugged and shockproof containing case

DESCRIPTION

SNIPER-GN is a new compact and transportable instrument which integrates a Special Nuclear Material (SNM) isotope identifier with a high resolution gamma detector. The identification of Plutonium isotopes is a unique feature of a patented analysis algorithm.

SNIPER-GN is easily deployable for rapid scanning of sensitive areas (restaurants, airports, subway stations, shopping malls, etc.) suitable for terroristic threats like dirty bomb and silent source.
Its compact design makes it also suitable for a series of sequential measurements in-field making it ideal for orphan source searching. The system is easy transportable and ready to use with a battery pack included in the shockproof case. The **SNIPER-GN** can detect and identify neutron sources discriminating fissile material (e.g. ^{252}Cf) alpha-n type sources (e.g. Am/Be) from

Plutonium. The compact spectrometer make use of a novel neutron/gamma PSD liquid scintillator coupled to a flat panel PMT.



SNIPER GN software in search mode: gamma counts time trend on top and neutron counts time trend below

SNIPER-GN is also equipped with an inorganic scintillator detector for the spectroscopic analysis. The 1.5x1.5 $CeBr_3$ good resolution allows identification of the gamma-ray emitters and recognition of SNM. The analysis algorithm is based on Pulse Shape Discrimination (PSD) operated by the digitizer that allows the discrimination between neutrons and gamma ray. The end-user can track the measurement thank to the GPS integrated in the device. The two detectors can be used together for a more accurate analysis that allow identification of SNM masked with strong gamma sources. Alarms will be triggered separately when the rate of gamma or neutrons are above the corresponding natural background with a Detection Probability of 95% at 95% Confidence Level. The performances of **SNIPER-GN** are compliant to IEC 62327 Hand Held Instruments for the Detection and Identification of Radionuclides standard. In case of neutron or neutron/gamma alarms, the identification of the radionuclide is performed by the device. Tests were also performed to check the neutron detection in high gamma ray field (up to 100 µSv/h) as required in the current specification for Homeland Security instrumentation. Finally, the performance of the detector has been also tested in presence of a magnetic field and it demonstrate to work correctly also in strong fields.

OPTIONS AVAILABLE

- **SNIPER-GN_bp** : backpack version with dedicated software for data visualization on smartphone or tablet

TECHNICAL SPECIFICATION

- Procedure: recommended 5 minutes warm up of the system when powered. 1 minute energy calibration. 3 minute background measurement.
- Typical scanning times:
  - 3 s for a gamma ray alarm
  - 10 s for a neutron alarm
  - 1 minute for identification of the gamma emitter
- Rugged and shockproof containing case
- Battery powered by pouch $LiFePO_4$ rechargeable battery
  - Nominal voltage: 12 V
  - Capacity: 20 Ah
- 5 A for $LifePO_4$ battery charger included
- Compact sizes: (L x W x D) = 470 x 175 x 335 mm^3
- Easy transportable: weight < 10 kg

Digital pulse analyzer DT5790

- Dual digital acquisition: 12 bit 250 MS/s Flash ADC
- Two ±4 kV, 3 mA HV bias outputs with SHV connectors
- PSD
- USB and Optical Link communication interfaces

Neutron/Gamma PSD detector

- EJ-309
- Dimension: 2” x 2”
- Neutron source identification allows discriminating U, Pu, Cf or Am/Be sources
- Flash Point: 144 °C
- Read out by flat panel PMT:
  - compact size
  - possibility of operation in magnetic fields

$CeBr_3$

- Spectroscopy with isotope identification
- Nuclide library compliant with the ANSI N42.34
- Energy Resolution FWHM at 662 keV < 4.2%
- fast timing

Pc

- LINUX based pc with software tools for front-end configuration, data acquisition, data analysis and display.

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