

HIGH EFFICIENCY MOBILE UNIT FOR RADIONUCLIDES IDENTIFICATION

GAMON-Mobile

APPLICATIONS AND SCENARIOS

GAMON-Mobile is a high efficiency detection system with automatic real-time identification of gamma emitting isotopes for the detection of radiological and nuclear threats.

GAMON-Mobile can be installed on cars, helicopters or boats to monitor wide areas, detect small deviation from natural background thanks to the high detector efficiency, provide detailed reports on the radioisotopes found.

GAMON-Mobile can be deployed in multiple scenarios ranging from the public event to a routine perimeter survey of sensitive areas.

GAMON-Mobile has extended radiation dose rate measurement range and configurable isotope-based alarm levels.

The **GAMON-D** can be deployed for

- radiological threat search,
- emergency and first-response application for an easy control of the area,
- large area survey and control for public events,
- georeferenced measurements for radioactive mapping.

DESCRIPTION

GAMON-Mobile is a high efficiency detection system designed to perform radionuclide identification from a moving vehicle as e.g. a car, helicopter or boat. The system is very well suited to be operated on-field to assess rapid threats and to monitor large areas via mobile mounting/deployment.



GAMON-Mobile system can be deployed in multiple scenarios for gamma radionuclide identification in case of accident mitigation, for access point security or environmental monitoring. It is ideally suited to scan sensitive areas, points of entrance and strategic areas such as embassies, EXPO events, critical infrastructure, airports, train stations.

GAMON-Mobile is composed by a large volume gamma spectrometer to run automatic isotope identification and isotope related dose rate evaluation. It can differentiate gamma radionuclides according to its category, as NORM, Medical, Industrial. The system can be optionally equipped with a dosimeter and a 6LiF/ZnS(Ag) based detector for neutron detection.

The real-time data processing and the defined isotope-based alarm allow **GAMON-Mobile** to detect the presence of artificial nuclides in a short time window and more effectively compared to traditional dose rate meters. The user can select the isotopes to be identified from an extensive library and adjust the thresholds of the isotope related alarms. The spectrum stabilization is obtained with the identification of natural occurring radionuclides as the ^{40}K .

As a reference, tests made in a real case scenario demonstrated that **GAMON Mobile** can **detect and identify a 242 MBq Co-60 source from a helicopter**

flying 60m high at a speed of 30 knots (55km/h) in less than 3 seconds.

Multiple **GAMON-Mobile** systems can be aggregated together to increase the detection efficiency. The standard configurations of aggregated systems in groups of two and four allows the operator to have additional information on the direction the gamma radiation source.

GAMON-Mobile allows the user to run two data acquisition modes:

Investigation mode for longer data integration time suited for the optimization of the identification of the radionuclides, and Operative mode suited for the surveying areas and search for suspicious radiation sources.



The gamma spectrometer is composed by an inorganic scintillation crystal of NaI(Tl). The volume of the scintillator is alternatively of 1, 2 or 4 litres. Signals from scintillation detector is pre-amplified and the pulse is digitized by a 12 bit 62.5 MHz fADC. Digital signal shaping and pulse height analysis is performed by a digital MCA with 2048 channels.



The spectroscopy detector is configured to collect gamma interactions in the energy range from 30 keV to 3 MeV. The scintillator also provides statistically accurate dose rate measurements in the range from 1 nSv/h to 10 µSv/h for 4 litre scintillator. An additional Geiger-Mueller counter extends the dose rate measurement up to a level of 10 Sv/h.

MAIN FEATURES

The GAMON Mobile is a transportable gamma radiation spectroscopy system designed to detect for radiological threats or searching orphan sources.

- High detection efficiency for detecting minimal variation in background radioactivity during survey
- Rugged housing for outdoor monitoring in public areas
- Aggregation capability for higher sensitivity and information on the radiation directionality
- Optional neutron detector
- Optional dual Geiger-Muller probe for extended dose rate range up to 10 Sv/h
- Web page for an easy system configuration and visualization of the measurements
- Programmable ROI based alarms
- Georeferenced and real time data visualized by the operator
- Internal database for an easy access to the acquired data
- Count rate alarm and alarm reporting to the operator directly on the notebook
- Embedded gain stabilization of the detector
- Wifi and Ethernet communication
- Embedded rechargeable battery

USE CASES

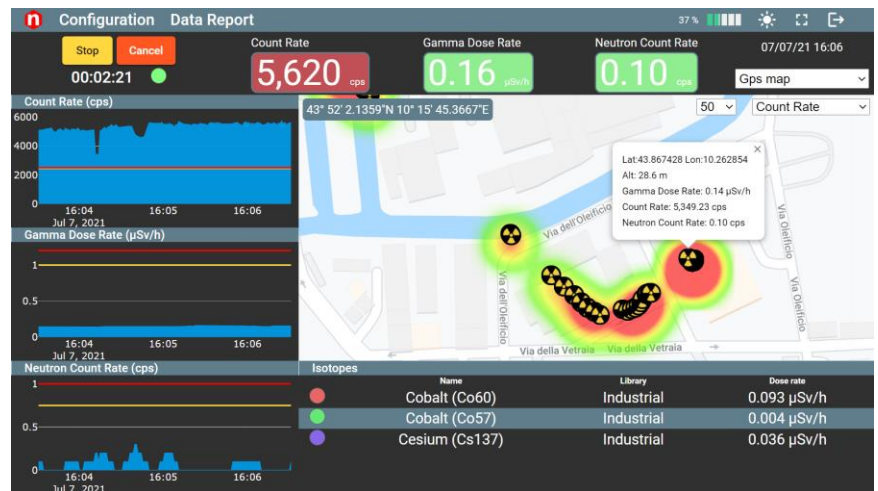
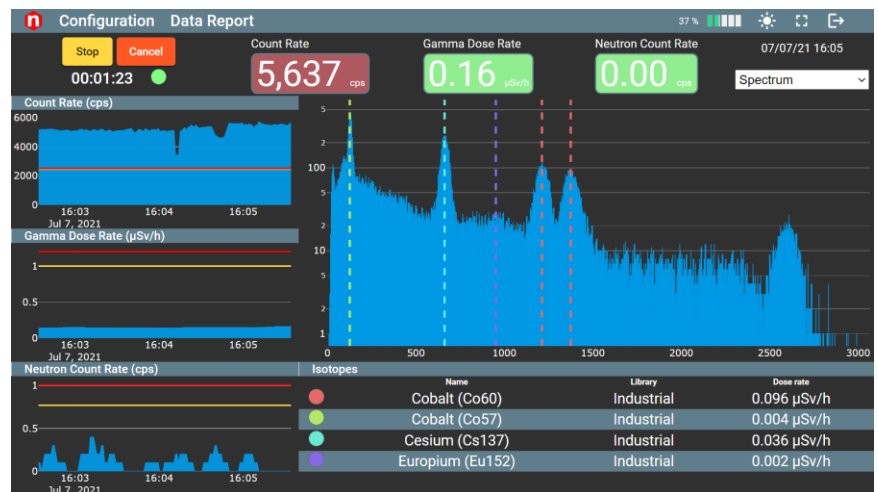
GAMON-Mobile is a transportable gamma radiation spectroscopy system designed to detect for nuclear and radiological sources.

- Large area surveys at the country borders
- Security of public events and cities
- Emergency and first-response application for a fast assessment of the contaminated area and remediation
- Large area monitoring in case of nuclear accident
- Orphan source search
- Georeferenced measurements for the radiological characterization of the soil
- Monitoring of TENORM at industrial sites
- Points of access monitoring as harbors, airports, train stations
- Discrete monitoring of suspicious vehicles or vessels

GAMON-Mobile embedded ARM based CPU stores the data in an internal non-volatile memory of 8 GB. **GAMON-Mobile** is provided with RJ45 Ethernet connection port and embeds an additional Wi-Fi interface.

The user interface of the software is web-based and can be visualized by any web browser running in a securely connected PC. No apps or software installation is needed, and compatibility is granted to any OS platform. Different levels of credentials are provided to guarantee that changes in the data acquisition settings are made by authorized users. Access credentials of the web interface can be configured by the administrator.

The real time spectrum is available on the dashboard. Counting and dosimetry trend of the last ten minutes are displayed with a waterfall chart to help the user in the search of radiological dispersal device. The GIS function display the georeferenced counting and dosimetry values on a map using a heat scale to highlight the hot spot locations. Reports are saved in the internal memory and can be easily downloaded on the web interface of the tablet.



The system is provided with standard tablet with 10.1" touchscreen sunlight readable with anti-glare solution, 7th Gen Intel® Core™ i5-7200U. It is certified MIL-STD-810G for shock, vibration and drop resistance, and IP65.

Alternative tablets or PC that can be provided under custom request.

TECHNICAL SPECIFICATIONS

Scintillation Detector

- Standard Version 4"x4"x16" NaI(Tl)
- Optional NaI(Tl) or NAIL™ detectors of 4"x4"x4", 4"x4"x8" size
- Energy range: 30 ÷ 3000 keV
- Energy resolution:
 - FWHM @ 662 keV (¹³⁷Cs): 7.5%
 - Rate Accuracy: < 10%
- Dose rate from scintillator: 1 nSv/h ÷ 10 µSv/h

Optional Neutron Detector

- Solid-state detection module for thermal neutrons
- Volume: 36.8 x 16.5 x 5.7 cm
- Sensitivity: 40 cps/nv

Optional Geiger-Mueller

- Two energy compensated GM tubes
- Energy range: 40 ÷ 3000 keV
- Dose rate 10 nSv/h ÷ 10 Sv/h

Sensors

- Internal temperature sensor
- GPS

Wired Communication interfaces

- Ethernet RJ45
- Communication protocol TCP/IP

Wireless communication interfaces

- 3G/4G LTE through the tablet
- WiFi

Data acquisition

- MCA depth: 2048 channels
- ADC depth: 12 bits
- ADC sampling frequency: 62.5 MHz
- Digital signal processing

Embedded PC

- Low power ARM based CPU
- Linux based operative system
- 8 GB internal data storage

Software

- Integrated web interface
- Local database and data repository

- Automatic nuclide identification
- Total and nuclide related H*(10) rates
- Spectrum stabilization with natural background
- Configurable isotope library
- Adjustable isotope related alarms
- Configurable data saving decimation
- Data acquisition in aggregated mode
- Maps with georeferenced data, displayed with colour codes

Power supply

- Power consumption: < 10 W
- Voltage: 5 ÷ 12 VDC
- Internal chargeable battery with 8 hours autonomy

Physical dimensions and weight

Basic version

- LxHxW 101 x 42 x 36 cm
- Weight 28 kg

Extended dosimeter + neutron detector

- LxHxW 101 x 42 x 36 cm
- Weight 39 kg

Environmental

- Temperature range -20 ÷ 50 °C
- Humidity 0 ÷ 95 %
- Protection rating: IP67

Case certifications

- STANAG 4280

Standard Military Tablet

- 10.1" touchscreen sunlight readable
- Intel® Core™ i5-7200U
- IP65
- Temperature range -15 ÷ 50 °C
- MIL-STD-810G compliant

Optional Tablets or Laptops under request



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