RN SECURITY SUITE: TRAINING

MOBILE AND DIVER

SOFTWARE FOR THE DATA VISUALIZATION AND POST-PROCESSING

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Viareggio, July 28 – August 01, 2025

GAMON Platform

DYNAMIC MONITORING NETWORK

Mobile measuring units for first emergency response, prompt intervention and homeland security

On the DASHBOARD you have a general overview, through quick glance, of:

- The current position of the systems
- The hot spots detected along the track
- The acquisition currently running
  - Current dose rate (µSv/h)
  - Current scintillator count rate (cps)
  - Current neutron count rate (cps)
- The real-time identification results

GAMON-Mobile

HIGH-EFFICIENCY VEHICLE-MOUNTABLE SYSTEM

Is a high-efficiency spectroscopic system designed to be easy mounted on vehicle (car, boat, helicopter…) .

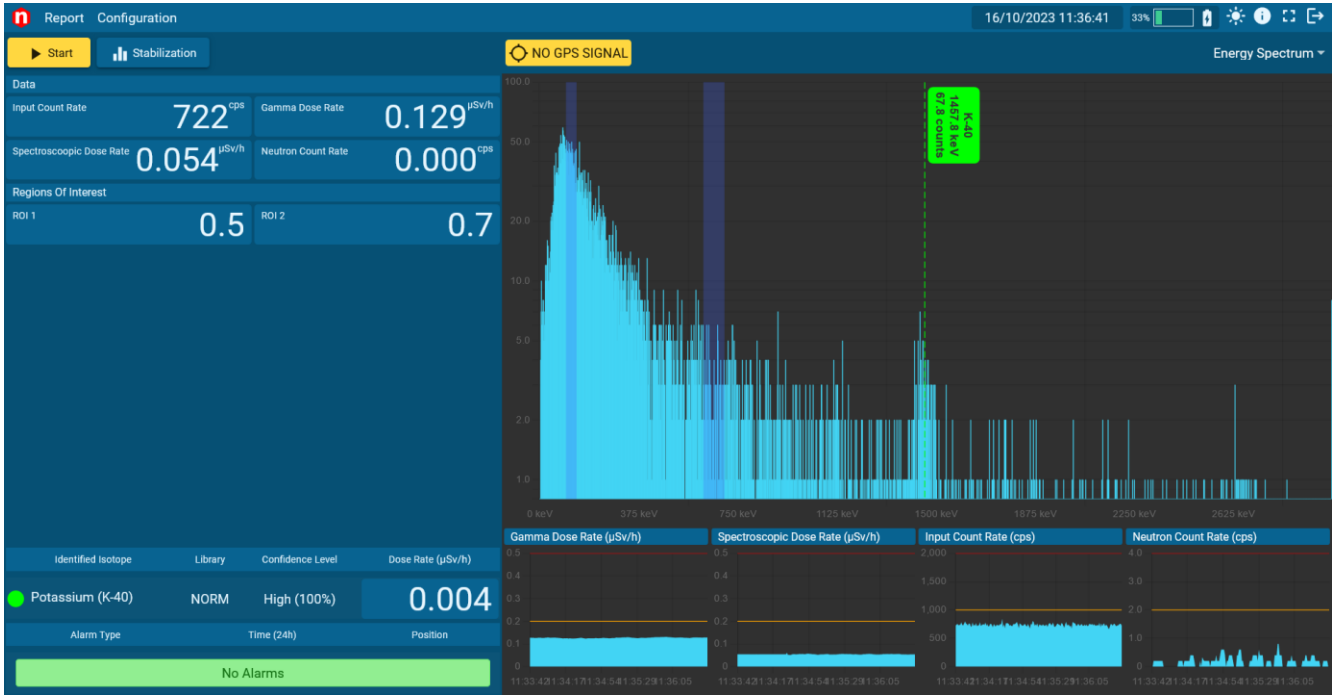
It is conceived for wide area monitoring (safety) or for fast identification in emergency prompt intervention (security).

It provides a live map of the radioactivity detected

Highlights

- Rugged housing for vehicle vibration and shocks
- Georeferenced map of the measurements for a real time data visualization
- Rechargeable internal battery
- L x W x D = (93.9 x 35.2 x 13.7) cm
- Weight = up to 39 kg with 4L NaI(Tl)

Software Interface



Definition of Region of Interest and Alarm threshold

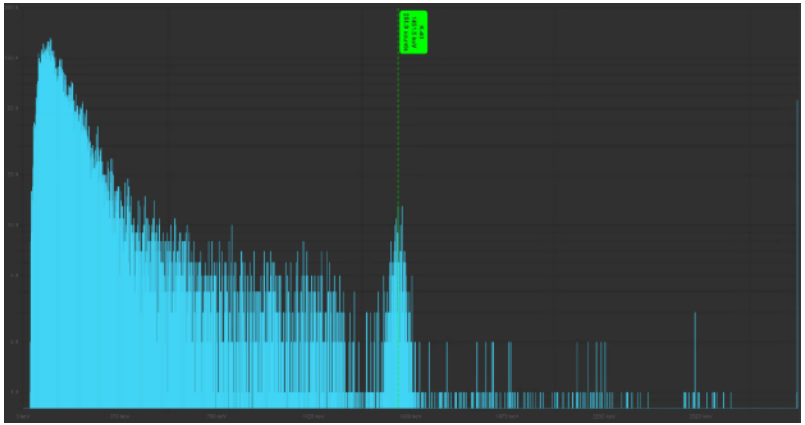
- Energy spectrum
- Map
- Spectroscopic Dose Rate
- Gamma/Neutron Count Rate

Flowcharts with the trend over time of dose and count rate

Spectrum Stabilization

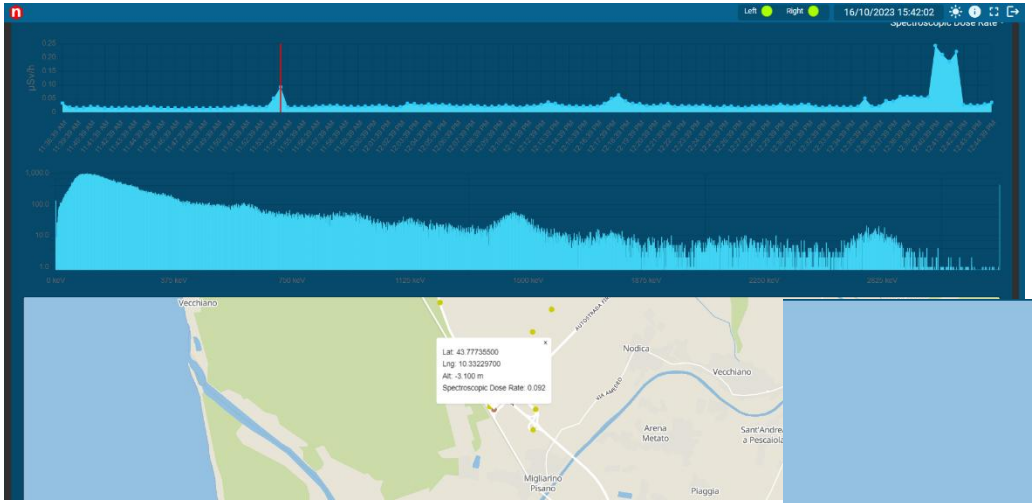
1. At the start up, the software performs the **gain stabilization** of the detector, adjusting the energy spectrum according to the position of the peak of the K-40

2. The stabilization is performed during the overall acquisition automatically every time there is a **temperature variation of 2°C**.



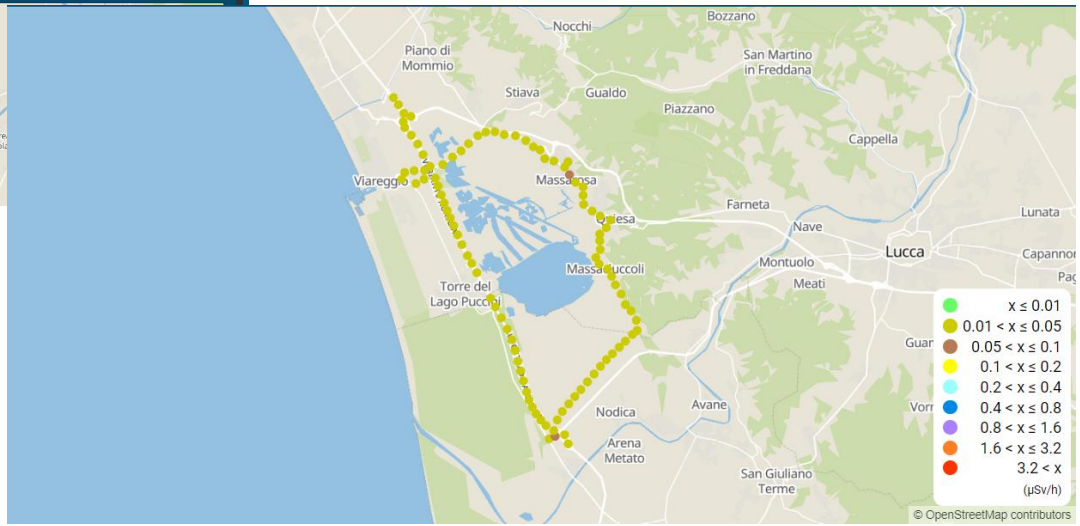
3. The user can change the reference peak and stabilization time in the configuration settings.

Software Interface



Mission report

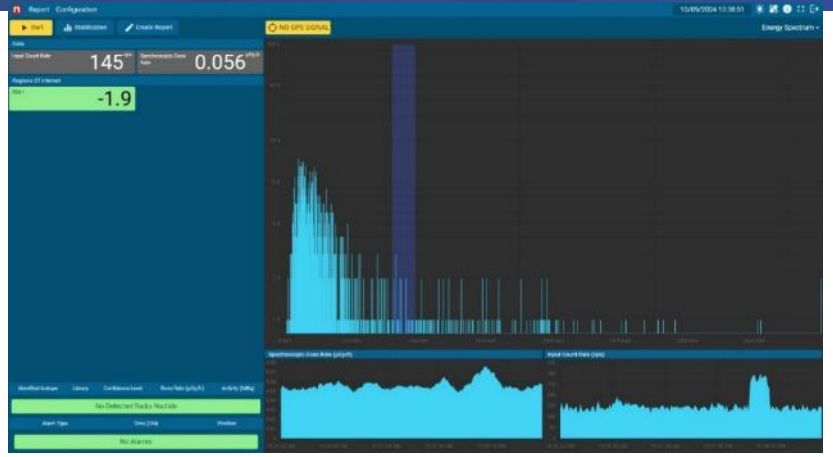
1. Point selection from the map or from the flowchart
2. Visualization of the waypoints in the map



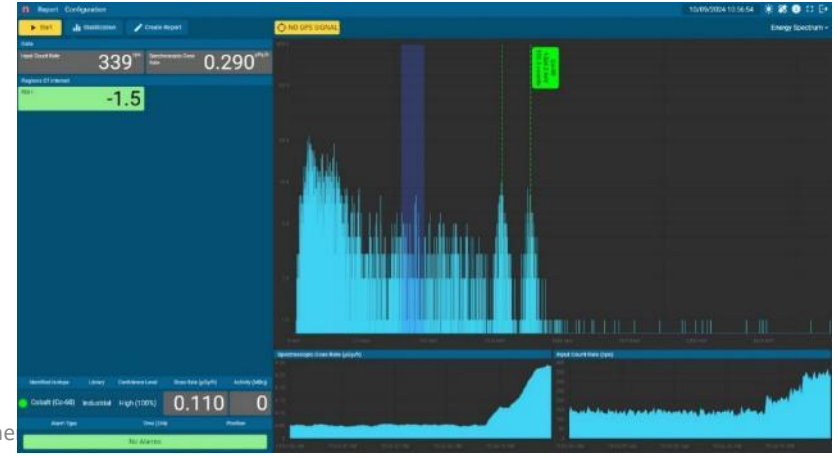
Red hotspots correspond to construction materials

Acquisition modes

1. **Operation** mode:
   - typical survey mode (sweep)
   - spectrum integration over 10 sec
   - moving window first in/first out

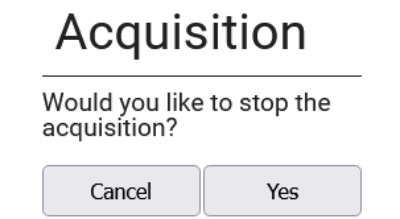


2. **Investigation** mode:
   - typical mode for source identification
   - spectrum accumulation from start to stop acquisition
   - activity calculation

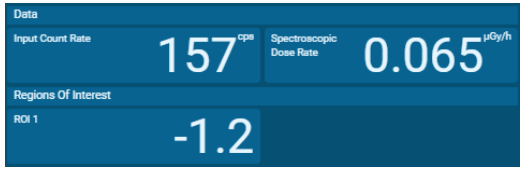


Toolbar and Main Data Display

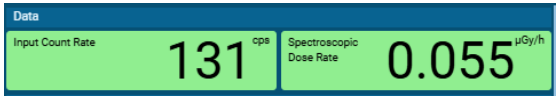
1. **Start mission**:
   - the time counter starts counting
   - the mission will be saved with an ID number and the name set by the user in the configuration
2. **Stop mission**:
   - confirmation message
3. **Create Report**:
   - to save data into the report



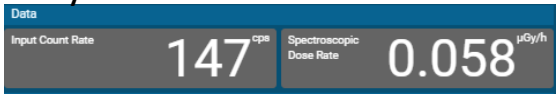
Blue->Stabilization



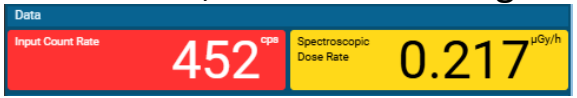
Green->Values below the threshold



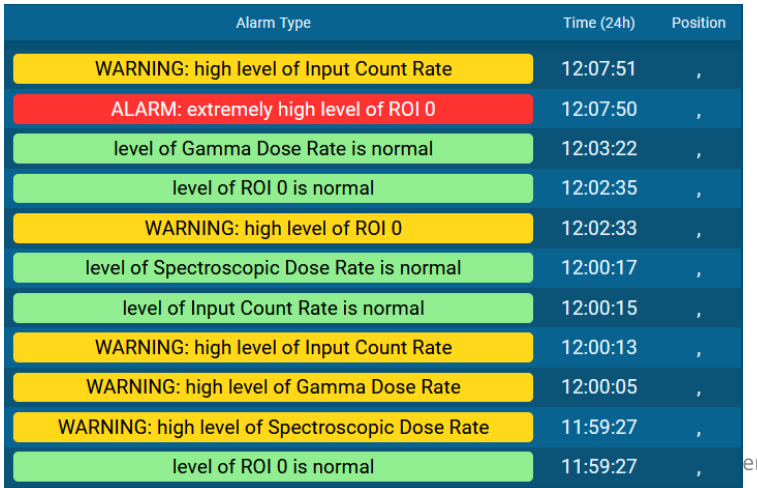
Grey->Alarm not enabled



Red->Alarm, Yellow->Warning



Region of Interests and List of Radionuclides



Alarm Type	Time (24h)	Position
WARNING: high level of Input Count Rate	12:07:51	,
ALARM: extremely high level of ROI 0	12:07:50	,
level of Gamma Dose Rate is normal	12:03:22	,
level of ROI 0 is normal	12:02:35	,
WARNING: high level of ROI 0	12:02:33	,
level of Spectroscopic Dose Rate is normal	12:00:17	,
level of Input Count Rate is normal	12:00:15	,
WARNING: high level of Input Count Rate	12:00:13	,
WARNING: high level of Gamma Dose Rate	12:00:05	,
WARNING: high level of Spectroscopic Dose Rate	11:59:27	,
level of ROI 0 is normal	11:59:27	,

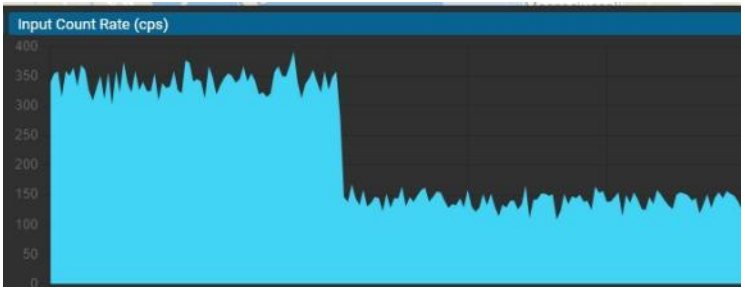
ROI value corresponds to the ratios between the slope of the count rates in the ROIs in the last 5 counting samples divided by the statistical uncertainty of the slope itself.
- Warning -> the slope is more than 4 times its statistical uncertainty
- Alarm -> the slope is more than 5 times its statistical uncertainty

List of Identified radionuclides
The element must be added in the library

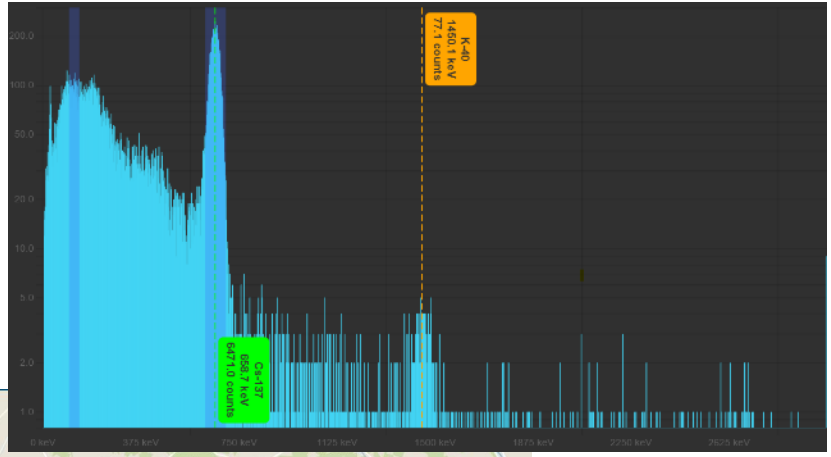
List of Warning and Alarms
with the time and position during the acquisition

Main Page plots

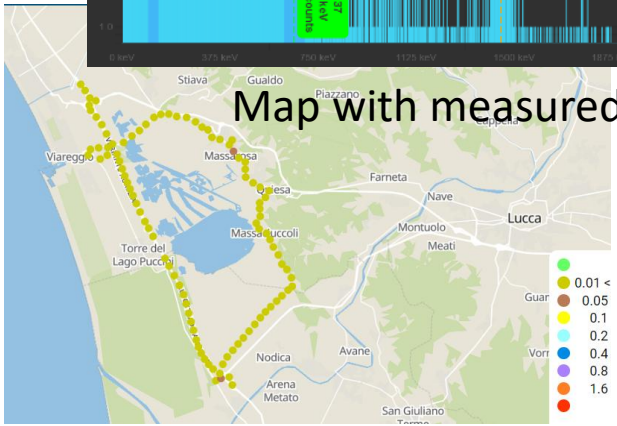
Flow charts



Energy spectrum



Map with measured points

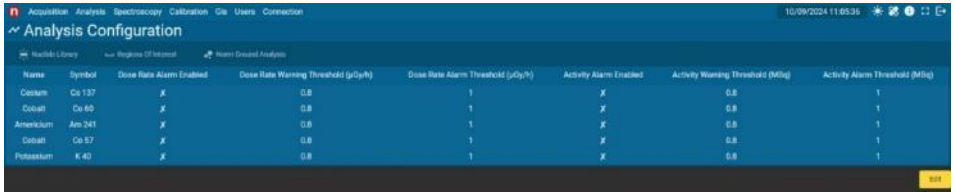


Configuration -> Acquisition

- **Notes** are an editable field that is recorded in the data reports.
- **Enable Report Data Saving**, that must be checked to save spectrum data into the report.
- **Decimation Period** sets the time granularity of the data saving. For example, if 10 seconds is selected, the system will save the integrated data each 10 seconds.
- **Saved Spectrum Bin Count** indicates the depth of the spectrometer spectrum

- **Acquisition Mode**. The option Operation sets the system for calculating real time data as moving widows for the use of the system in mobile surveys. The option Investigation sets data acquisition such that the calculated quantities are referred to the integrated data, suited for static measurements in areas of interest.
- **Alarm Mode** enables or disables the notification of the warning and alarms. The standard configuration is “Online Acquisition Only”, that allows the alarm to be visualized when the system is running the data acquisition.
- **Mission** is an editable field that is used to label the reports generated automatically by the system after the data acquisition.

Configuration -> Analysis

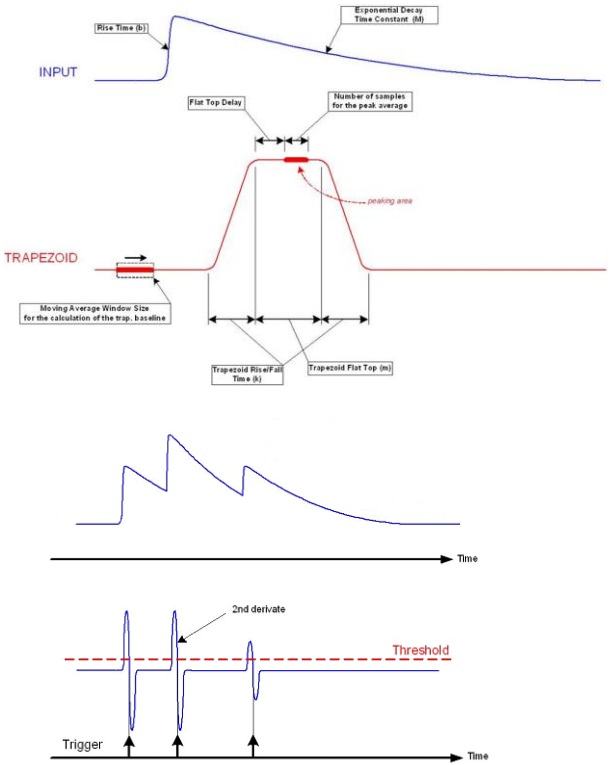


- **Nuclear Library**. The algorithm will search and identify online radionuclides added in the library.
  Enable alarm and warning values.

- **Regions of Interest**. Enable/disable region of interest ranges and alarm in the ROI of the spectrum

Configuration -> Spectroscopy

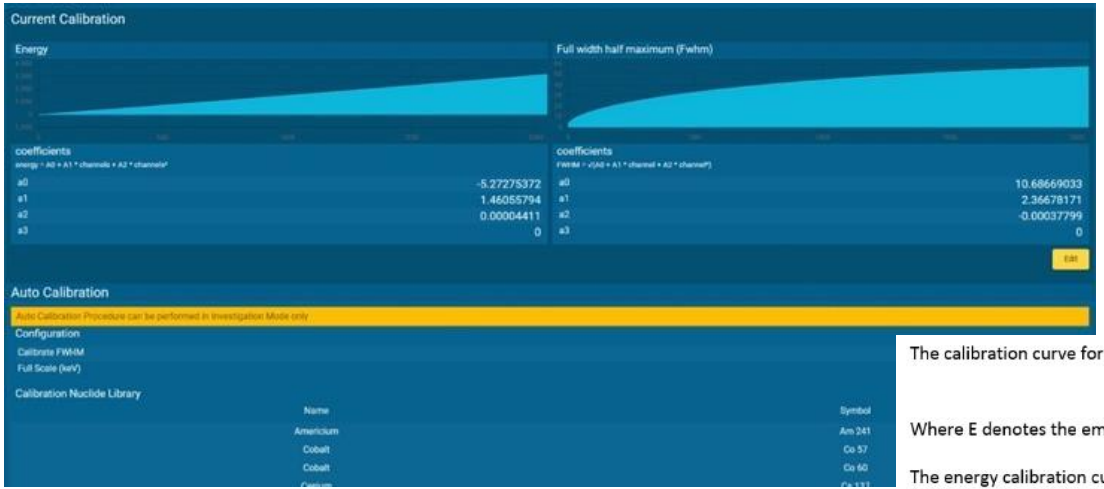
WARNING: Modifications in the parameters contained in the page may result in system malfunctioning.



- **Temperature Stabilization**. Set the reference peak and the time for acquiring statistics

Configuration -> Calibration

WARNING: Modifications in the parameters contained in the page may result in system malfunctioning.



The calibration curve for the FWHM is of the type:

$$FWHM = \sqrt{a_0 + a_1 * E + a_2 * E^2}$$

Where E denotes the emission line energy of a given isotope and FWHM the resolution to that specific energy

The energy calibration curve, on the other hand, is of the type:

$$E = a_0 + a_1 * ch + a_2 * ch^2$$

Where E indicates the energy of the emission line of a given isotope and ch the channel corresponding to the centroid of that line.

- a0 indicates the term of degree 0
- a1 indicates the term of grade 1
- a2 indicates the term of grade 2

Reports list

NOTE: In the main page, press «Create Report» button to save the report

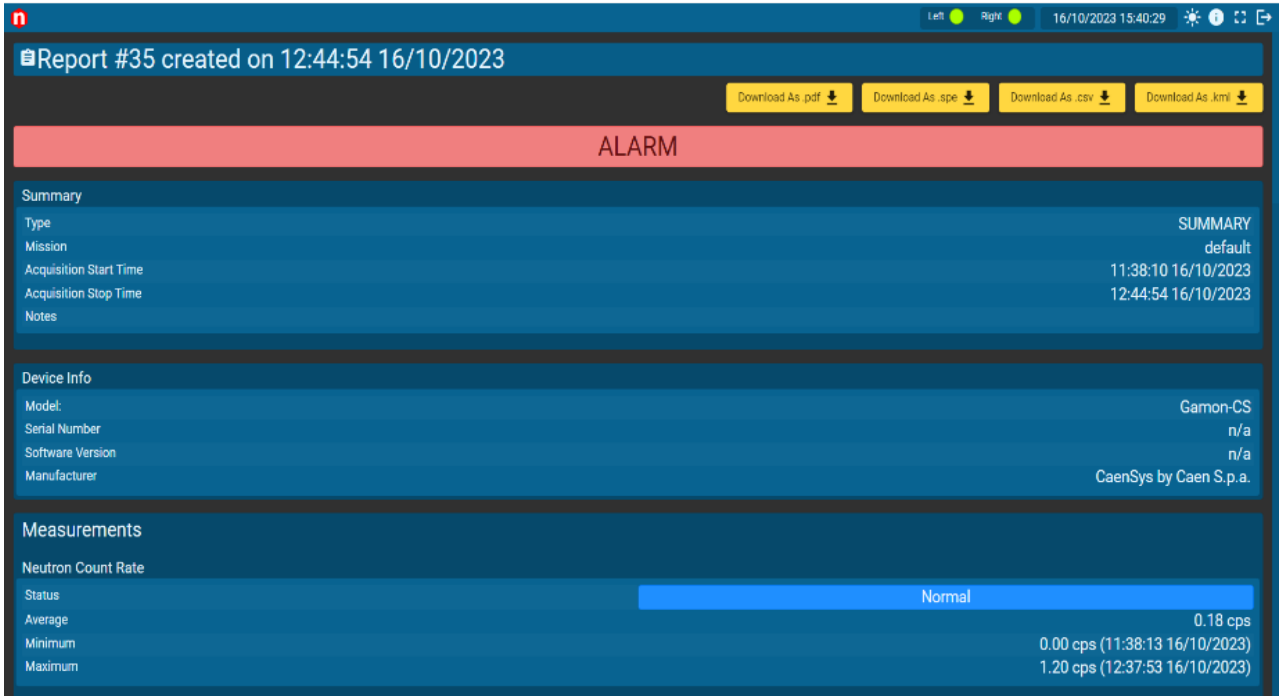
Creation Date

Normal/Warning /Alarm status

Unique ID number

Open and Delete buttons

Report information

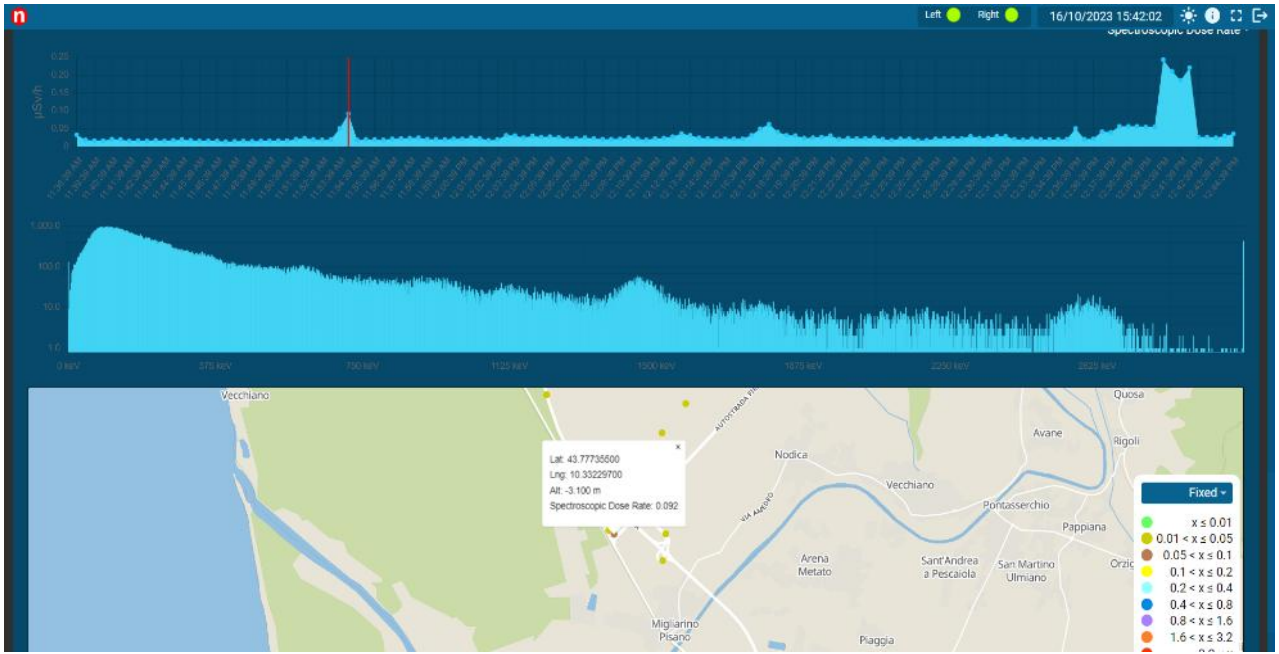


Summary
mission name/date, etc.

Device info

ICR max, min, average
Spectroscopic Dose Rate
Identified Radionuclides

Report information



Spec dose rate trend

Spectra accumlated at the Cursor position on spectra
Dose rate trend cursor

GPS position of the spec Dose rate trend cursor

Data Saving Options

The report can be saved into multiple options:

- “Pdf file” saves the report as a pdf file.
- “Download spectra” button transfers all the spectra in the selected time window during the survey, exported in spe files.
- “csv” exports into a .csv file
- “kml” exports the file in a compressed folder where the kml files are saved

GAMON - DIVER

GAMON-Diver

Compact Underwater System for Radionuclides Identification

GAMON-Diver

Compact Underwater System for Radionuclides Identification

- It provide in real time the activity concentration (Bq/l) of the identified isotope instead of the dose rate for single isotope

THANK YOU!

SCAN ME

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