



DETECT, LOCATE, IDENTIFY, QUANTIFY

# SPIR-Ace™

Radionuclide Identification Device (RIID)  
with quantitative assessment capability



## FEATURES

- Ultra fast and accurate search and nuclide identification
- Identifies heavily shielded materials, unbalanced mixes, and Special Nuclear Materials masking scenarios
- Generic ISOCS™ characterization, pre-loaded efficiency calibrations
- Connects to Genie™ for immediate and easy quantification
- Works in contaminated environment and with fast temperature changes thanks to the sourceless LED stabilization
- Efficient source localization features with onboard directional radar and radiation mapping
- Remote display and control through a web page (over Wi-Fi) for high radiation levels, hard to reach locations, or UGV measurements
- Live data transmission and reachback, including to CBRNResponder and SpirVIEW Mobile™ software

## DESCRIPTION

The SPIR-Ace unit is a versatile Radio Isotope Identification Device (RIID) addressing all applications requiring efficient detection and identification of radiological threats in security applications, including civil defense, border security and customs. The SPIR-Ace device can be used in law enforcement, emergency response and other critical infrastructure applications. It also provides accurate assessment of nuclear materials for power plants, safeguard inspections, and forensic laboratories.

The device, coupled with offline Genie software, becomes a highly portable and powerful instrument for *in situ* measurement applications. The direct compatibility with Genie (CNF), ISOCS efficiency characterization, and onboard geometry selection, enables efficient quantitative assessment.



DETECT, LOCATE, IDENTIFY



QUANTIFY

The SPIR-Ace device is available with a NaI detector for more efficient detection, search, and localization. Or also with LaBr<sub>3</sub> for better resolution needed with complex spectra. The optional integrated neutron detector and the optional alpha/beta external contamination probe are available to cover all the hazards and threats.

## Detect, locate, Identify

### Passive Detection

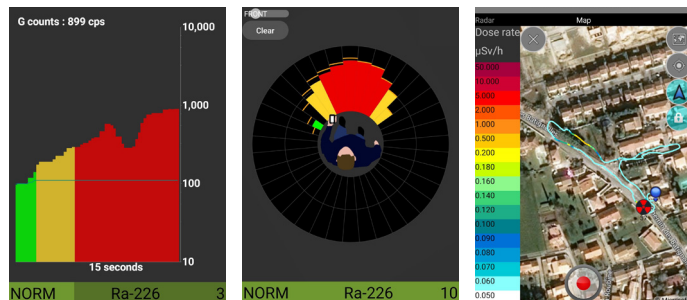
Detection of higher gamma or neutron rates activate the screen, generate alarms. The device provides continuous nuclide identification.

- Upon detection, the SPiR-Ace device vibrates and triggers various visual and sound alarms (configurable).
- The screen provides all the information to evaluate the situation, with no button to touch.
- Low, high, and danger alarm levels are adjustable.



### Search

Use the Radar and Histogram screens to localize a source, and map the geolocation of the hotspot area.

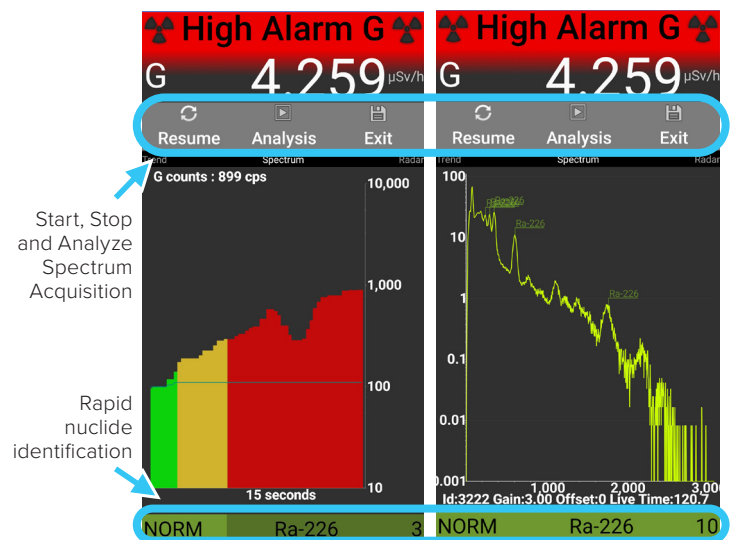


- The **Trend** screen helps locate the source (automated identification may already provide a result).
- The **Radar** screen provides direction to the source.
- **Mapping** with hotspot localization.

### On-board Nuclide Identification

SPiR-Ace unit provides rapid nuclide identification directly on the device.

- The SPiR-Ace unit offers on-device identification performance beyond current standards for RIIDs such as for heavily shielded isotopes, unbalanced mixtures of nuclides and Special Nuclear Material (SNM) masked by medicals or Naturally Occurring Radioactive Material (NORM) within a few seconds.



Start, Stop and Analyze Spectrum Acquisition

Rapid nuclide identification

NORM Ra-226 3

NORM Ra-226 10

Non-expert can acquire confirmation measurements from all screens.

Spectrum screen available for advanced/expert users.

### Remote Display and Start

Connect to the SPiR-Ace device with a hotspot or Wi-Fi connection and enable acquisition from a safe or more accessible location.

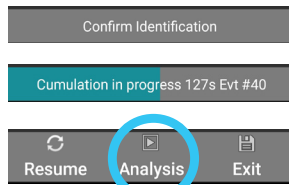
- This can be to minimize the operator being near the measurement location, especially for longer acquisition counts.
- Remote start enables difficult to access or high dose rate measurement campaigns.
- The SPiR-Ace unit provides an IP address, to use on any web browser from a device connected to the same network. If there is no network the SPiR-Ace unit can act as a hotspot and other devices can connect using the QR code showed by the SPiR-Ace device.
- Start a spectrum count, view active updates of the current count rate and spectrum, and review past measurements and nuclide identifications.

## Quantitative assessment

Acquire spectra for a longer time to improve statistics and export to Genie software for nuclide identification confirmation and activity calculation.

### Factory Calibration

- The SPIR-Ace device has generic detector characterizations, and each unit is calibrated for energy and FWHM, so that exporting to Genie software is seamless and reliable. Additionally, the SPIR-Ace device has a fast and automated calibration tuning function, so that a simple check source can be used to reset the effective energy range if long-term gain shifts are observed.



**1** Select **Confirm Identification** to start a spectrum. At end of count, select **ANALYSIS** to view the event details.

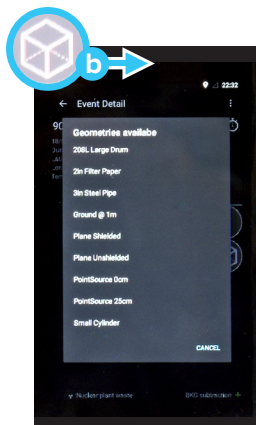
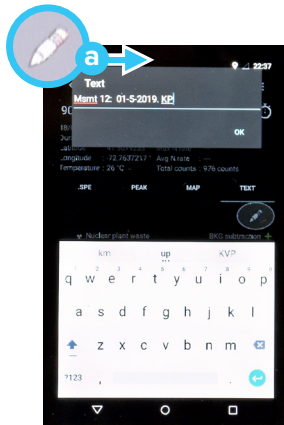
### ISOCS Characterization

- Each SPIR-SPEC package comes with a generic ISOCS efficiency characterization of the SPIR-Ace detector accurate to 15%-25%. When combined with S573C ISOCS Calibration software, users can create additional custom geometries for most *in situ* applications. These efficiencies can be used to either accurately calibrate and analyze spectra already acquired, or they can be loaded into the SPIR-Ace device.
- When an efficiency is loaded into the SPIR-Ace unit, it becomes available for selection as a geometry and is immediately associated with a count, allowing for activity to be calculated in a single step in Genie software.



**3**

Export CNF file to Genie via USB or Email on Wi-Fi. Analyze with your familiar ASFs in Genie software for full quantification and nuclide analysis reporting.



**2**

- a** Optionally enter a sample description
- b** Select a geometry/efficiency calibration

**Exit** to save and create Genie Spectral file.

### Genie Spectroscopy Software

- Genie Spectroscopy Software is a comprehensive environment for display, analysis and reporting of the spectrometry data acquired on the SPIR-Ace device. The software is based upon time-proven methodologies that have a long history of acceptance and refinements; it includes patented and defensible analysis and calibration techniques.
- Efficiency calibrations can be created with ISOCS software and the 3-dimensional Geometry Composer for interactive definition and visualization of custom counting geometries. The ISOCS process is widely accepted and compliant with 2009 NRC Regulatory Guide 1.21.

Reachback to an expertise center by email, or use the web remote control web page, or simply connect by USB to a Genie platform computer to perform the full analysis.

## NUCLEAR CHARACTERISTICS

### Detectors

- NaI(Tl) version: dia 35 mm x 51 mm (1.4 in. dia x 2 in.)
- LaBr<sub>3</sub> (Ce) version: dia 25.4 mm x 34 mm (1 in. dia x 1.34 in.)
- Energy compensated GM tube for high gamma dose rate
- Optional neutron detector: moderated <sup>6</sup>LiZnS:Ag scintillator
- Optional external alpha/beta GMP-25™ contamination probe

### Energy range

- 25 keV to 3 MeV (gamma)
- 0.025 eV to 15 MeV (neutron)

### Gamma dose rate range

- 0.001 μSv/h to 100 mSv/h (0.1 μR/hr to 10 R/hr)

### Identification

- Fast digital MCA, 1024 channels, throughput >100 000 cps
- Single, bare or shielded, and mixed isotopes
- Seven libraries containing 80 nuclides
- Identifies up to eight nuclides simultaneously
- Detection and identification performance exceeds ANSI N42-34, IEC62327 and IAEA NSS 1
- Identifies the radionuclides in 5 to 15 seconds at a dose rate of 0.5 μSv/h (50 μR/h)

## FUNCTIONAL FEATURES

### Interface

- 4.3 in. color touch screen LCD readable in all lighting conditions
- Fast display update (every 0.25 s)
- Alarm indicators: LEDs, vibrator and sound
- Touch screen and two buttons for gloves/Personal Protective Equipment (PPE) operation
- Earphone jack
- Spectrum acquisition: auto on alarm, manual, periodic
- Languages: English, French, Korean, Chinese, Japanese, Russian (additional languages on request)

### Connectivity

- Internet connection by Wi-Fi:
  - Send measurements by emails with n42 and CNF files (spectra with efficiency curves and geometry)
  - Remote supervision with SpirVIEW or other software using file transfer (FTP or HTTP/SSL)
  - RadResponder/CBRNResponder (spectrum)
- Remote display and control via a web enabled wireless device (Wi-Fi)
- Records the location of all measurements/events (mapping)
- Micro USB connection
- Wi-Fi beta/gamma/neutron
- GNSS receiver (global GPS)

## CHARACTERISTICS

### Standards Compliance

- ANSI N42.34
- IEC62327
- CE

### Environment

- Operating temperature range:
  - NaI: -20 °C to +55 °C (-4 °F to +131 °F)
  - LaBr<sub>3</sub>: -20 °C to +50 °C (-4 °F to +122 °F)
- Humidity: 93% relative humidity at 40 °C
- Water and dust: IP65

### Electrical

- Li-ion rechargeable, built-in charger, replaceable
- Battery life: 8.5 hours (up to 15 hours with screen off most of the time)
- Charge time: 5 hours (device turned off) with regular 2.1 A/5 V USB adapter

### Physical

- Weight: maximum (NaI and LiZnS detectors) 1.45 kg (2.2 lb)
- Dimensions: 206 x 153 x 57 mm (8.1 x 6.2 x 2.2 in.)

## ACCESSORIES AND OPTIONS

### Included accessories

- Transportation and storage case
- USB AC power adapter
- Micro USB cable/Hand strap/Earphones

### Bundles

- Genie basic software (to calculate activities from a computer)
- NaI+Neutron variant in rugged case
- NaI+Neutron variant in rugged case + GMP-25 contamination probe