LUDLUM MEASUREMENTS, INC.

DiscoveRAD
Radionuclide Identifying Device (RID)

The **DiscoveRAD** is a high efficiency radionuclide identifier (RID) instrument designed for fast detection and accurate identification of radioactive sources. It is an ultra-compact, rugged, sensitive Radionuclide Identifying Device (RID). Its weight and dimensions allow it to be worn on a belt while performing gamma and neutron measurements in real time.

The **DiscoveRAD** provides in a user friendly interface:

- Dose Rate Mode: with neutrons and dose rate (in Sv/h or rem/h) real-time values and alarm thresholds displayed simultaneously. Radioprotection alarms are provided by audible and vibration alarms.
- Survey Mode: with gamma, neutron, and dose rate real-time values and gamma and neutron alarm thresholds displayed. An audio alarm with a tone proportional to the count level warns the user of the severity of the threat.
- Easy Finder Mode: provides directionality to localize the source.
- Identification Mode: live spectrum visualization and automatic report generation including: identified isotopes, their category (IND, NORM, MED, SNM) and confidence level of the identification.

The **DiscoveRAD** is the first RID available with a 2 x 1 in. size BGO detector combined with high precision, high-speed digital electronics in an ergonomic, lightweight, water-tight (IP68) aluminum housing that provides superior usability by offering a wider energy range and better stability in a wearable handheld. Other detectors are available depending on your application (see table on next page).

The **DiscoveRAD** isotope identification is extremely accurate because it uses a template matching algorithm combined with exceptional spectrum stabilization instead of traditional peak search.

Features

- Spectra View and Analysis with Data Storage (25 GB) for Reachback
- Small, Lightweight (< 1.25 kg [2.75 lb])
- Underwater Operation up to 1.5 Meters (IP68)
- User Interface with Day and Night View
- High Accuracy Dose Measurement
- Finder Mode with Directionality
- Spectrometry at up to 1 Million cps Between 10 keV to 10 MeV
- Replaceable Batteries
- Multiple Modes of Configuration
- Operation from Remote PC with Full View of the Screens
- N42.42 Data Format
- Superior Efficiency with Rugged Non-Hygroscopic BGO Detector

The **DiscoveRAD** is made for the mission thanks to its superior and patented stabilization algorithm (pat. US 9,864,076) which does not require any built-in source or LED. The novel patented stabilization compensates gain shifts and temperature effects immediately and automatically. The main advantages of this new method are:

- No internal radioactive stabilization source is "blinding" the instrument.
- No buggy LED light emitter can compromise the stabilization.
- Superior stability in every situation.

The consistent performance of the **DiscoveRAD** under all conditions and environments, while maintaining the highest accuracy in the results, reduces false positives and expedites decision-making in the field. Highly sophisticated analog and digital electronics make it possible for the first time to measure a wide gamma dose rate range and neutrons with a single BGO detector. Small radiation levels can be detected earlier, quicker and with higher accuracy than by other comparable handhelds. Strong radiation sources are measured and identified by the **DiscoveRAD** at very high input rates. Spectrometry is performed at up to 1 million cps between 10 keV to 1 MeV.

All measurements are saved on the instrument (25 GB user storage capacity) and can easily be transferred without special software. Its multiple interfaces and the built-in web interface allow easy and flexible reach-back operation. The interface also provides for secure remote maintenance and remote operation of the instrument.

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Specifications

RADIATION MEASUREMENT PERFORMANCE
- 70 Nuclides (exceeding IEC 62755, ANSI 42.34)
- Operative in less than one minute
- Identification of 1 µCi of Cs-137 in 13 s
- Real-time linearization of gamma energy

SENSORS
- GPS: switchable 72 channel M8 engine (Navstar, Galileo, Glonass, Beidou)

COMMUNICATION INTERFACES
- USB-C power and data port
- Wi-Fi access point 2.4 GHz 802.11 g, encryption WPA-PSK AES
- Bluetooth LE for connection to the Mobile App

DATA ACQUISITION
- MCA depth: 1024 channels

PHYSICAL
- Dimensions: 235 x 88 x 92 mm (9.3 x 3.5 x 3.6 in.)
- Weight: 950 - 1,250 g (2.1 - 2.75 lb) depending on detector type
- Housing Material: aluminum

OPERATING CONDITIONS
- Protection Rating: IP68 according to IEC 60529, water resistant to a maximum depth of 1.5 m (4.9 ft) for up to 30 min
- Operating/Storage Temperature: -20 °C to 50 °C (-4 °F to 122 °F)
- Operating Humidity: up to 93% at 40 °C (104 °F) non-condensing
- Charging Temperature: 0 °C to 40 °C (+32 °F to 104 °F)

SOFTWARE
- User-interface update frequency is 0.5 s
- Operative Modes: Dose rate, Survey, Easy finder (directionality), Identification, Expert modes
- Web Server: Web Interface for setup, data download and remote control
- Data Streaming: Supporting Sigma streaming API via BT tethering
- Data Reporting: Supporting Sigma reporting API via BT tethering
- Session Data: Continuously tracking GPS position, dose rate, alarms and identification results
- Night mode
- Screen rotation
- 25 GB internal data storage

POWER SUPPLY
- Secure rechargeable Li-Ion battery pack (1 + 1 spare included)
- Run time at 20 °C (68 °F): > 6 h (non-alarm state)
- Run time at -20 °C (12 °F): > 1 h (non-alarm state)
- AC/DC included 220/100 Vac to 5 Vdc

MOBILE APP
- Remote Operation: Use any mobile device to remotely operate the instrument
- Reachback functionality (Mail with attached ANSI 42.42 data)

STANDARD COMPLIANCE
- RID Environmental Tests: IEC 62706
- Data Format: ANSI 42.42, IEC 62755

ACCESSORIES
- Rugged carrying case, Micro-B socket USB cable

Version	BGO	LABR	NAI
Part Number	77-1001	77-1002	77-1004
Operating Range	Gamma and thermal neutron detection	Gamma detection (neutron detection optional)	Gamma detection
Material	$Bi_4Ge_3O_{12}$ (Gd_2O_3)	$LaBr_3$:(Ce,Sr)	NaI:Tl
Size	51 Ø x 25 mm^3 (2 x 1 in.)	38 Ø x 38 mm^3 (1.5 x 1.5 in.)	51 Ø x 25 mm^3 (2 x 2 in.)
PHR (@662 keV)	9.0 ± 1.5 %	2.4 ± 0.3 %	6.0 ± 0.5 %
Energy Range	10 keV – 1000 MeV (Total) 10 keV – 10 MeV (Gamma and X-rays) 10 MeV – 1000 MeV (cosmic radiation, muons, charged particles)		
Dose Rate Range Total (Cs-137)	10 nSv/h - 500 mSv/h (1 µrem/h - 50 rem/h) ± 30 %		
Dose Rate Range ID Mode (Cs-137)	10 nSv/h - 200 µSv/h (1 µrem/h - 20 mrem/h)		
Dose Rate Range Current-Variance Mode (Cs-137)	200 µSv/h - 500 mSv/h (0.02 rem/h - 50 rem/h)		
Dose Rate Overload Range (Cs-137)	> 500 mSv/h (50 rem/h)		
Energy Response (60 keV - 3000 keV)	< ± 30%	< ± 15%	< ± 20%
Maximum input Count Rate in ID Mode	1 million cps (Cs-137)		
Gamma Sensitivity (Cs-137)	1,850 cps/µSv/h	950 cps/µSv/h	1,750 cps/µSv/h
Neutrons	According to ANSI N42.34	-	-
Neutron Sensitivity	~5 cps/nv	-	-

Other detectors may be available upon request

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Systems & Spectroscopy Division

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