

RadSearch:

Radioactivity and Decommissioning Monitor

G3050

Introduction

RadSearch is a device for measuring and quantifying radiation in the environment. It is particularly applicable to decommissioning and nuclear cleanup activities. *RadSearch* is capable of searching for, locating and quantifying radioactivity distributed on surfaces, within equipment and in pipe work and determining radiation dose in the environment. It consists of a detection head with a combined lanthanum bromide (LaBr₃) scintillation detector and photomultiplier, video camera and distance measuring laser range-finder system.

MANUAL MODE

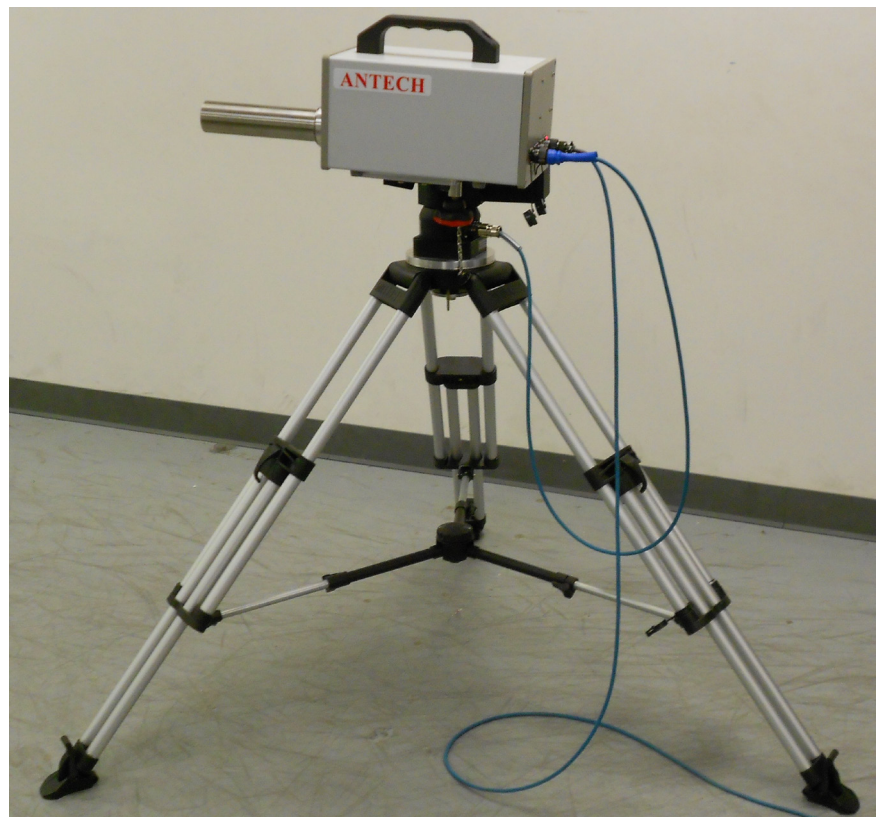
An operator can initiate manual scanning to search a specific surface or piece of equipment. *RadSearch* is very flexible and can be used to quantify a wide range of radionuclides using its medium resolution lanthanum bromide scintillation detector. Specific radionuclides can be preselected and regions of interest established to cover parts of or the entire detection gamma ray spectrum. Spectral data is archived and can be reanalysed at a later time for alternative radionuclides.

SCAN MODES

RadSearch can be set to scan an area automatically and locate radioactivity on surfaces and inside components. The measured distribution and intensity of the radioactive source is overlaid onto a video image. In the scan modes a variety of fields of view (FOV) can be selected and the device can be set up to search an entire room or region over a period of several hours.

RadSearch is readily transportable and is normally operated from a tripod, to which the internal pan and tilt mechanism is mounted. It can be unpacked from the transport case and deployed in less than ten minutes. Alternatively, the detector head may be mounted on other devices, such as mobile carts. This enables the *RadSearch* to be deployed remotely into areas of high radiation background. *RadSearch* can contribute to reducing the exposure of operators to radioactive sources in decommissioning and radioactive cleanup operations.

RadSearch employs an one-inch lanthanum bromide scintillation detector that provides the advantages of medium range resolution, high sensitivity and wide dose rate range. The lanthanum bromide detector is mounted in a tungsten shield with a small aperture tungsten collimator.



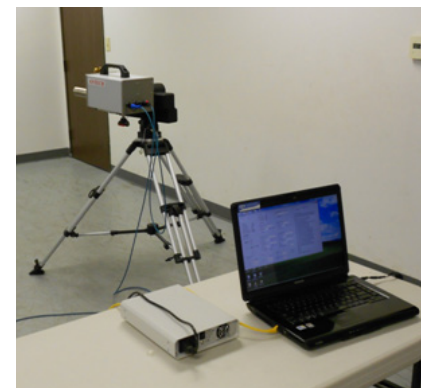
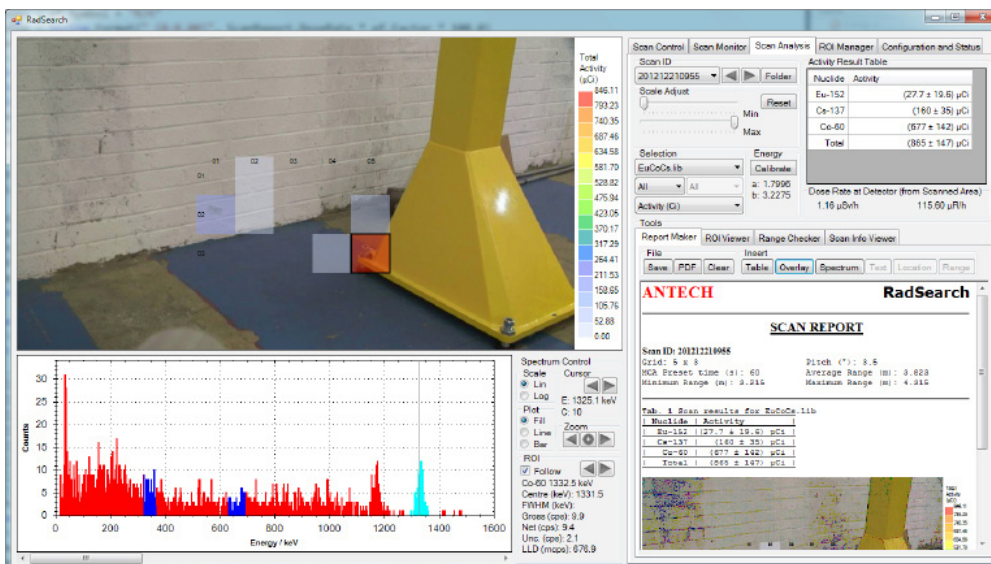
All of the detection, motion control and analysis electronics are located in the detector head. The external components consist only of a power supply unit, which provides low voltage DC to the detector head, and a notebook computer on which the control and data analysis software is located. A single combined power and Ethernet cable links the detector head to the external electronics.

Features

- Lanthanum bromide scintillation detector with medium resolution, high detection sensitivity and wide dose rate range
- Tungsten shielded and collimated detector aligned with CMOS video camera
- Energy range 30 keV to 2000 keV
- High resolution CMOS camera with auto-focus
- Laser range-finder (0.05 m - 65 m natural surfaces)
- Detector environmental rating to IP65
- Ethernet communication to external laptop computer
- A single cable of up to 80 metres connects the detector with the remote rugged laptop computer (work station) - 40 m cable as standard
- Detector head can operate without direct connection using 24 V battery and wireless Ethernet

Benefits

- Lightweight, flexible, medium resolution system that can be readily deployed in the field and in contaminated buildings (deployment time < 10 minutes, one person)
- Identifies a wide range of radionuclides and records gamma-ray spectra for archive purposes and potential future analysis
- Directly measures gamma-ray dose rate and activity
- Reduces operator exposure to radioactivity
- Software operates on any standard PC employing Windows Operating System with Ethernet connectivity
- Performs far field assay of objects and surfaces with 18° detector FOV with collimator barrel removed or 4° detector FOV with barrel fitted
- Rugged PC with solid state drive and long battery life supplied as standard



Above: RadSearch deployed showing PSU and notebook computer.

Left: Scan Analysis screen showing overlay display and results tables.

Specification

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| Scanning angle | ± 180° degrees pan, ± 90° tilt |
| Spectral range / Collimator viewing angle | 18° full sensitivity (collimator barrel removed); 4° (collimator barrel installed) |
| Dose Rate range | 0-500 mGy/hr for ¹³⁷ Cs (At higher dose-rate with barrel plug) |
| Operating range | <1 µCi to 0.5 Ci for ¹³⁷ Cs in detectorfield of view at 1 metre |
| Energy range | ~30 keV to 2000 keV |
| Operating voltage | 110 - 230 VAC, 50 - 60 Hz (wide ranging) or 24 VDC |
| Detector | LaBr ₃ (1 inch x 1 inch) |
| Component weight | 20 kg Detector head (without collimator barrel); Collimator barrel 4 kg; 13 kg Pan-tilt unit; 7 kg Collapsible tripod; 1.4 kg Power supply unit; 2.7 kg Rugged notebook computer |
| Total weight | 53.2 kg (without transport cases), 96.5 kg (with transport cases) |

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