

DEPARTMENT OF PUBLIC SAFETY

BACKPACK RADIATION DETECTION SYSTEM REQUIREMENTS

General System Requirements

The detector unit shall:

- A.1) Perform spectroscopic gamma detection and isotope identification using sodium iodide (NaI) detectors.
- A.2) Provide a gamma energy range of at least 20 keV to 3000 keV.
- A.3) Provide gamma spectra with 2048 channels.
- A.4) Have a neutron counting option available.
- A.5) Be capable of supporting a minimum of 2 spectroscopic gamma detectors, 2 gamma counters for high radiation doses, and 1 optional neutron detector (and operate with fewer detectors if desired). In addition, the ability to support different types and sizes of gamma and neutron detectors, to provide versatility in detector configurations and to support potential future upgrades, is an asset.
- A.6) Provide left versus right gamma directionality information to indicate the location of the source and alarm category, with both visual and audible announcements available.
- A.7) Be easily transferable from one bag to another and be usable without a bag, if desired.
- A.8) Weigh 25 lbs or less.
- A.9) Have an operating temperature range of at least -4°F to +122°F (-20°C to +50°C).
- A.10) Have a battery life of at least 10 hours.
- A.11) Be supplied with a user manual, in English, which clearly describes the operation of the system.
- A.12) Include the capability to wirelessly connect one or more smartphones, where the smartphones provide the user interface.
- A.13) Include the capability to connect a single smartphone directly to the detection unit via USB connection, where the smartphone provides the user interface.

The smartphone shall:

- A.14) Provide the user interface.
- A.15) Include Bluetooth capability to support the use of a wireless headset for audible alarms.
- A.16) Be supplied with a ruggedized case.

Software Requirements

The system software shall:

- A.17) Perform energy calibration automatically, with no radioactive check sources required.
- A.18) Perform automatic, spectroscopic isotope identification using an isotope library that contains, at a minimum, all isotopes listed in Table 3 of ANSI N42.53-2013.
- A.19) Permit isotope library customization by authorized users using a Microsoft Excel interface, including enabling or disabling isotopes, assigning alarm categories, adding new isotopes, and/or modifying alarm criteria for any particular isotope.
- A.20) Categorize alarms into five categories, such as "Threat", "Suspect", "Industrial", "Medical", or "Naturally Occurring Radioactive Material", or equivalent.
- A.21) Automatically update the background gamma and (optional) neutron levels in real time to reflect changes in the environment, while including provisions to prevent contamination of the background due to the presence of radioactive sources.
- A.22) Include both continuous and manual modes of operation. Continuous mode shall allow the system to constantly scan its surroundings, analyzing data on a regular interval and immediately providing alarms. Manual mode shall allow the user to manually start and stop data collection.
- A.23) Output data in ANSI N42.42-2012-compliant format.
- A.24) Provide alarm data that is tagged with date, time, and location.
- A.25) Support data transfer from the system to reach back centers using a wireless connection.
- A.26) Shall support rapid upgrades and parameter changes, without requiring on-site Vendor support.

The user interface shall:

- A.27) Be provided on a smartphone that can communicate either wirelessly or by USB cable with the detector unit.
- A.28) Be easy to read, suitable for use by a law enforcement officer or other designated first responder, and designed for low operator visibility during night-time operations.
- A.29) Provide gamma and (optional) neutron count rates in real time.
- A.30) Provide dose rate information in real time.

- A.31) Display dose rate in at least the following units: microrem/h and microSv/h.
- A.32) When an alarm occurs, provide a clear visual indication to the user that includes the alarm category, left or right side location (if known), and isotope identification (if known), and allow the user to acknowledge the alarm.
- A.33) Allow the user to view a gamma spectrum associated with an alarm.
- A.34) When an alarm occurs, provide an audible alarm to the user that includes the alarm category, left or right side location (if known), and isotope identification (if known). Audible alarms shall be user-selectable between civilian terms and military phonetic alphabet indicators. The audible alarms shall also have an option to be muted.
- A.35) Allow the user to view information on previous alarms including isotope, alarm category, left or right side, and date/time.
- A.36) Include system health indicators, to indicate if the system is fully functional or experiencing any health errors.
- A.37) Include a help screen, which provides the user with system help information and allows the user to submit a technical support request to the Vendor using a wireless connection.
- A.38) Facilitate reach back activities, including sending of data to reach back centers.

WARRANTY REQUIREMENTS

- A.39) Must include the standard one year product warranty.
- A.40) Must have the option to purchase additional extended product warranty.