



# NASRAMS Naval Shipboard Radiation Monitoring System

## Features

- Provides detection and measurement of both prompt and residual (Fall-out) gamma and neutron radiation
- 10 channel standard configuration
- Outstanding linearity over a wide dynamic range
- Ultra long detector life and calibration stability
- Operates in and withstands extreme environmental conditions as specified in MIL-STD-810
- Detector will not saturate in gamma fields to 20 Gy/hr

## Key Benefits

- Provides continuous real-time radiological information with a centralized readout for informed decision-making
- High degree of reliability
- Easy to maintain
- Programmable radiation simulator for realistic training exercises

## Applications

- Military vessels/vehicles

## Description

The NASRAMS is a shipboard radiation monitoring system that provides continuous real-time radiological information on board military vessels/vehicles. It provides detection and measurement of prompt gamma and prompt neutron dose, along with residual gamma dose rates. NASRAMS is typically comprised of the following components:



- NASRAMS Main Indicating and Alarm Unit (Control Panel) – Provides centralized indication and alarm of all remote radiation detectors. A separate display module for each detector displays gamma dose rate at the detector location. This unit also includes a built-in controller used to conduct simulated radiation training exercises.
- Remote Radiological Detectors – Continuously detect and transfer data into the NASRAMS Control Panel concerning the presence and level of radiation. The typical NASRAMS system employs 10 detectors, though other configurations are available (consult sales representative for details).

### Key Functionality of Main Indicating and Alarm Unit (Control Panel)

- Continuously displays dose rate and alarm status for each detector in use
- Provides total dose exposures for each channel by operator action (push button)
- Individual pre-settable alarms for both dose rate and total dose for each detector
- Alarms identified and indicated by specific channel and general alarm indicators (both visual and audible)
- Provides four hours of backup battery to power the system in case of a power outage
- Each display module within the Main Indicating and Alarm Unit has a backlight to facilitate use in a darkened room
- Splash-proof enclosure
- Built-in controller used to conduct simulated radiation training exercises

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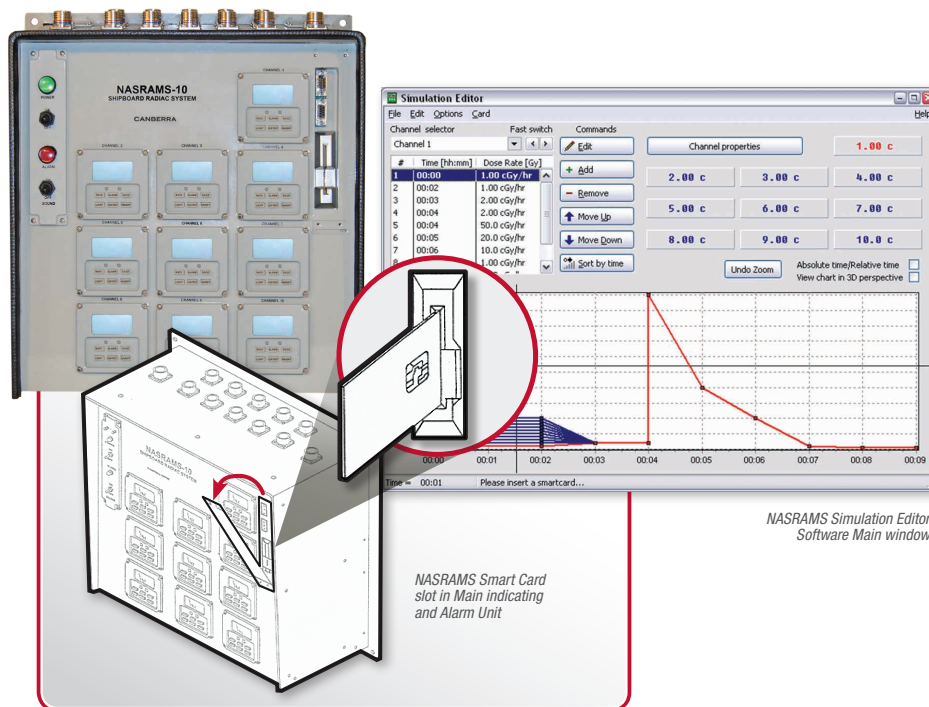
## Naval Shipboard Radiation Monitoring System

### Key Features of Remote Radiological Detectors/ Detector Probe Assemblies

- Detectors continuously detect and transfer data into the Main Indicating Unit about the presence and level of radiation
- Probe Assembly consists of two detectors, a high voltage power supply and electronic circuitry, all enclosed within a protective stainless steel canister and mounted to a platform
- Probe/platform assembly incorporates shock-absorbing mounts to stabilize against abrupt or potentially disruptive vibration
- Waterproof housing assembly unit
- Visual indicators of center location of the Low and High Range Gamma detectors aid in proper mounting/ placement of detectors

### Conduct of Radiological Test Exercises

Realistic training exercises are readily available with the NASRAMS to insure competent and effective crew performance in the event of a radiological emergency. The programmable radiation simulation functionality includes time variable simulated radiation levels (including statistical fluctuation) such that the training exercise will accurately depict a real life radiation environment. Exercises are uploaded to the Main Indicating and Alarm Unit by way of a Smart Card which is pre-programmed by the training officer using Simulation Editor Software. The start and finish time of the exercise, as well as the radiation readings as a function of time can all be pre-selected by the Training Officer to reflect almost any type of residual radiation event.



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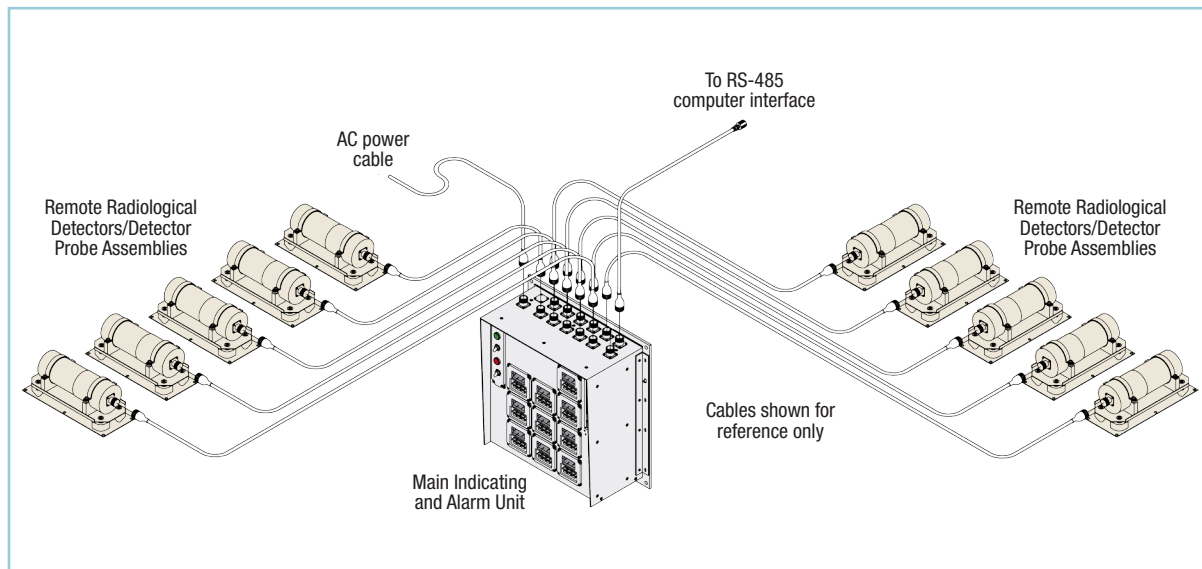
### Reliability and Maintainability

The NASRAMS reflects a high level of reliability and ease of maintenance. This is required in order to keep the life cycle cost of the equipment at a low level and more important, to ensure that the system is capable of performing its intended function 99.99% of the time. NASRAMS is derived from the military qualified AN/UDR-13,14,15 Radiac Sets (Pocket Radiacs) that were developed by Aptec-NRC, now CANBERRA, under contract to the US Army. A range of testing documentation for NASRAMS is also available to confirm suitability for military use.

### Specifications

#### MAIN INDICATING AND ALARM UNIT

- NASRAMS – 10 Channels. Consult factory for alternate configurations
- Direct reading liquid crystal display with available backlight for night operation, three significant digits, floating decimal point, unit and alarm status indicators, large digits readable at 80 in. (2 m)
- System: Power ON/OFF
- Alarm selection On/Off/Audible/Visual/Aud/Vis
- Audible alarm – 100 db at 40 in. (1 m)
- Visual alarm – bright flashing light
- Alarm identified to specific channel
- Channels (each): RATE, DOSE, CLR/TEST
- Detectors connected via RS-485 data bus
- Individual pre-settable alarms for dose and dose rate
- Settable over entire dynamic range, auxiliary contacts provided for remote alarms
- Power – 85-240 V ac  $\pm 20\%$ , 50 to 60 Hz 1 A, or 12 to 24 V dc, 2 amperes



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## Naval Shipboard Radiation Monitoring System

- Back-up rechargeable battery capable of four hours of operation in event of line failure
- Gasketed aluminum cabinet with rear panel wall mount. All cabling by connectors through top of cabinet. (Cables not included in standard configuration.)
- Dimensions: 406 x 152 x 381 mm (16 x 6 x 15 in.) (W x D x H)
- Weight: 18.2 kg (40 lb)
- Operating Temperature: -50 °C to 50 °C (-58 °F to 122 °F)
- Storage Temperature: -50 °C to 70 °C (-58 °F to 158 °F)
- Humidity: 98% RH and 50 °C (122 °F) continuous
- Salt Environment: Meets MIL-STD-810E for shipboard use
- Vibration: Shipboard vibration meets MIL-STD-167
- Prompt Radiation: Gamma – PMOS-FET device  
Neutron – PIN DIODE
- Will not saturate up to 10 Gy/hr
- Response Time – Within 10% of final reading in 4 s at 0.01 cGy/hr, returns to background within 4 s
- Temperature: Operating -50 °C to 50 °C (-58 °F to 122 °F)
- Temperature: Storage -50 °C to 70 °C (-58 °F to 158 °F)
- Humidity: Withstands constant humidity at 98% RH and 50 °C (122 °F)
- Immersion: Watertight and splash tight per MIL-STD-810E
- Salt Environment: Continuous exposure per MIL-STD-810E
- Vibration: Shipboard vibration meets MIL-STD-167
- RS-485 operating bus
- Sealed stainless steel housing with aluminum liner for EMP and EMI immunity

### REMOTE RADIOLOGICAL DETECTORS/ DETECTOR PROBE ASSEMBLIES

- Accuracy – ±15% of true dose and dose rate over entire dynamic range
- Gamma Dose Rate (Residual) 0.01 µGy/hr to 10 Gy/hr
- Gamma Dose (Residual) 0.001 µGy to 10 Gy
- Mixed Gamma/Neutron Dose (Prompt) 5 cGy to 10 Gy
- Gamma Energy Response – ±15% from 80 keV to 3 MeV
- Residual fields, two GM tubes operating in Time-to-Count mode

### SYSTEM OPTIONS

- Optional Seawater Detector: GM-based detector provided with cable for use underwater
- Seawater Detector Dimensions: Cylindrical: 304 x 63.5 mm (12 x 2.5 in.) (L x dia.)
- Seawater Detector Weight: 1.8 kg (4 lb)
- Seawater Detector: Watertight to 100 ft depth (continuous)