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# WG Radiation Detection Portal

Applications

- Airports
- Borders
- Government facilities
- Logistics companies
- Military bases
- Ports

The WG Radiation Detection Portal provides fast and accurate radiation detection and classification of sources in vehicles and sea freight containers.

By rejection of naturally occurring radioactive materials (NORM) and with a false alarm rate of less than 1:10,000 it minimises the need for costly secondary inspections.

When secondary inspections are required, its intuitive heat-map imaging allows for targeted inspections of multiple threats, further increasing operational efficiency and reducing operator burden.
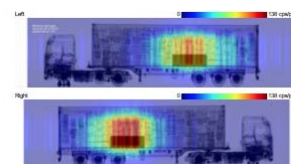
High system reliability is attained by continuous and automatic end-to-end digital stabilisation, calibration and health monitoring system which eliminates the necessity for annual calibration and maintenance activities.

Its modular system architecture provides for rapid scaling, repairs and upgrades to meet your current, new and evolving detection requirements.

Features

- Flexible Solution: Retrofittable, upgradeable, multiple detector types and combinations, optimized detection zone, easy integration with x-ray systems, wired and/or wireless (3/4G) communications

- High Reliability & Availability: Predictive maintenance, remote, real-time diagnostics and a highly modular system results in rapid upgrade and repair times

- Intuitively Locate Sources: Overlay radiation intensity as a heat map on photographs, schematics or x-ray images for fast identification and targeted secondary inspection of one or more threats within a single load

- Superior Threat Detection and Classification: Delivers fast, simultaneous and accurate classification of multiple and masked isotopes in challenging portal environments

- Unrivalled Operational Efficiency: Exceptionally low FAR, identification of 18 isotope groups and superior NORM rejection minimising the need for costly secondary inspections

- On-board processing for spectral enhancement backed up with extensive analysis of real-world data resulting in: -

- Fully functional and accurate operation through temperature shock
- High true-positive and low false-positive isotope identification
- Identification of masked isotopes that cannot normally be resolved when analysing raw spectra
- Predictive maintenance and no annual calibration required
- Reliable and scalable 3He-free neutron detection even in high gamma exposed fields
- Switch on and operate in high radiation fields
- World-beating classification and identification performance of NORMs and non-NORMs

Specifications
Configuration

- Detector Modules (dual-sided system): 40-160 l PVT modulesNNS:2000 3He-free neutron, detectors (6Li:ZnS)
- Functions: Isotope detection and advanced classification, neutron detection, spectral analysis, dose rate meter, instant online reporting
- Detection Zone Configurations: 4-6 m standard lane width from 0 m to 5 m detection zone height Oversized lane width and height configurations
- Start-up Time: 5 Minutes

Performance

- Identification: Exceeds ANSI N42.35
- Isotope Classification: NORM / Medical / Industrial/ SNM
- NORM / Medical / Industrial/ SNM: By isotope
- False Alarm Rate: < 1:10,000
- Energy Range: 25 keV to 3 MeV
- Dose Rate Range: 10 nSv/h to 100 mSv/h (1 μR/h to 10 R/h) 137Cs with automatic scintillator shutdown protection
- Recovery Time after Over-range Exposure: < 30 s
- Neutron Sensitivity: 252Cf 10,000 n/s @ 2.2 m/s @ 2.5 m (7.2 ft/s @ 8.2 ft)
- Response Time: Instant response to sources (0.1 s)
- Source Location: < 0.9 m (3 ft) positioning accuracy for bare sources
- Maximum Transit Speed: Up to 30 km/h (18.6 mph)
- Stabilisation & Health Monitoring: Automatic and continuous end-to-end digital calibration, stabilisation and health monitoring
- Library: 18 isotope categories in a customisable library
- X-ray Integration: Compatible with x-ray capabilities up to 9 MeV

Input – Output

- Power: Single-phase AC supply voltage of 110-240 AC, 47-63 Hz with UPS
- Data & Connectivity: PDF reports, ANSI N42.42 compliant Optional: 3/4G wireless communications
- Command Centre User Interface: Integrates with existing IT structure and user interfaces
- Camera Options: Optional: ANP and sideview (inc. fisheye) camera integration

Environmental

- Operating Temperature: -30°C to 55°C (-40°F to 131°F)
- Relative Humidity: Up to 93% relative humidity, non-condensing, 40°C (104°F)
- Ingress Protection: IP65 as per IEC 60529Optional: IP68 to 1.2 m (4 ft) depth of water as per IEC 60529
- Environmental Protection: Optional: Hurricane resistant up to 177 km/h (110 mph) wind speed

Note: Export Licence Required

Radiation Portal Monitoring (RPM) – The Challenge

RPMs are deployed to stop the movement of illicit sources, a busy port will typically generate between 50 and 100 alarms a day (18,250 - 36,500 alarms per year). This is because approximately 2% of containerized cargo emits gamma radiation from Naturally Occurring Radioactive Material (NORM).

These cargos emit enough radiation to generate radiation alarms when transiting an ANSI N42.35 compliant radiation Portal Monitor (RPM). This is because the ANSI N42.35 RPM specification does not require the RPM portal to discriminate between a safe level of Naturally Occurring Radioactive Material (NORM) and a threat isotope.

Therefore, an ANSI N42.35 compliant RPM will produce a radiation alarm every time a bulk cargo containing NORM passes through the RPM. To maintain security, each of these alarming loads must be diverted out of the stream of commerce into a secondary process. In a typical secondary process, each alarm takes 30 minutes to process. This corresponds to 9,125 – 18,250 person hours.

The secondary process, that typically takes 30 minutes, then determines if a threat or a dangerous level of radioactive material is present or if the cargo is safe to continue to its final destination.

If you only buy an ANSI N42.35 compliant system, you have an inexpensive solution that costs a huge amount to operate!

The Answer

This RPM meets the ANSI N42.35 detection specifications and simultaneously classifies bulk Naturally Occurring Radioactive Material without compromising security. This directly reduces the number of trucks diverted out of the stream of commerce into the secondary process. In practice at a busy port we will generates less than 5 alarms a day that require secondary inspection.

System Benefits

- Calibration and stabilisation maintained for 8 years before the first scheduled service
- Command and control for single and multiple lane configurations
- Continuous calibration is performed by the instrument automatically
- Detection Capability monitored and guaranteed
- Environmentally protected
- Exceeds ANSI N42.35 requirements for RPMs
- In addition to these primary functions, the system provides important checks on system health and perfectly calibrated and stabilised spectra for reach-back to support actionable identification decisions
- No annual maintenance is required
- Reduces Nuisance Alarms from NORM in cargo
- RPM can be installed in 1 day and provides superior operational performance.
- Simple to use Graphical User Interface (GUI)
- Threat detection and NORM classification algorithms

System Components
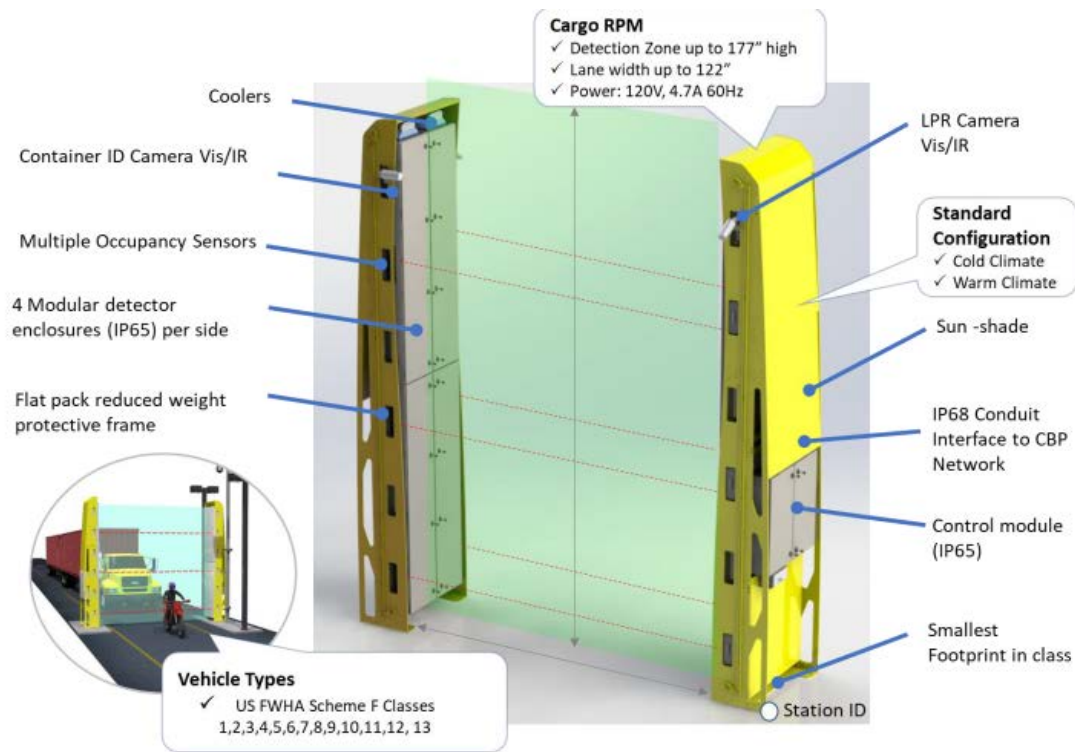
The RPM provides a vertical detection zone extending above the RPM pillar height to 4.5m.

The standard configuration is designed for an extended environmental range [-40 to 55℃, 93% Humidity at 40℃, 110 Solar Watt/ft2] that includes General, Warm and Cold Climates.

The enlarged detection zone enables the Portal to detect, locate, categorize and (partially) identify nuclear material and identify NORM materials by isotope in conveyances for all classes of vehicles.

Six occupancy sensors per lane are positioned at various heights on the entrance and exit of the enlarged detection zone and mounted within protective covers that ensure operation in inclement conditions and the detection of various size vehicles. The occupancy system is augmented by a Visual Imaging Systems (VIS) that enhances resilience to false occupancy triggering.

Usability
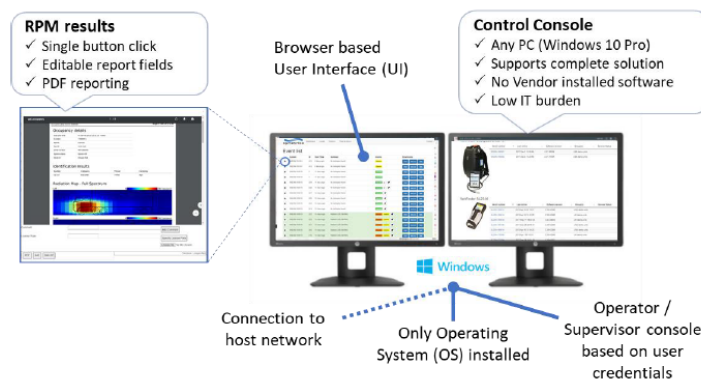
The RPM uses a console to deliver primary control, monitoring, and data viewing. Controls are provided for standard and advanced users. The system is simple to use and uses graphical representations for radiation location data to reduce training burdens. It can generate a human readable PDF report and ANSI N42.42 compliant data for every transit. The communication features allow the system to connect to and provide data to experts in real time.