ARG-US

Remote Area Modular Monitoring for Packaging and Critical Facilities

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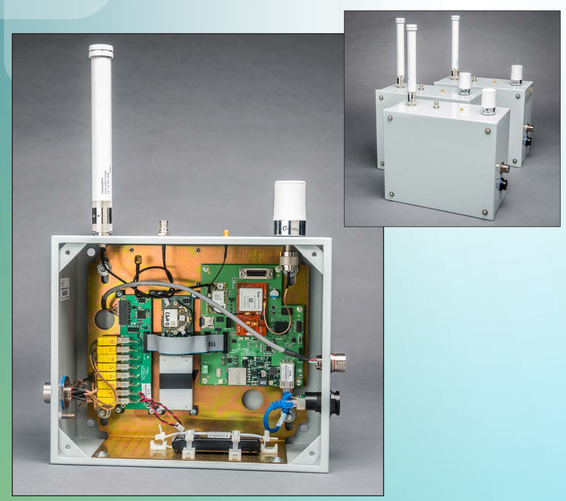
OVERVIEW

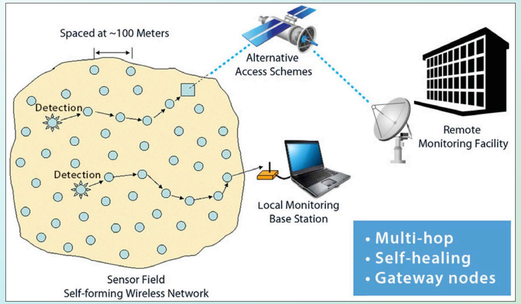
ARG-US Remote Area Modular Monitoring (RAMM) is as an expandable, adaptable system for primary and backup monitoring of dry cask storage systems, as well as packaging and critical facilities. The RAMM architecture is designed with particular emphasis on:

- Expandability with new sensors
- Use of multiple power sources (including Power over Ethernet [PoE] and battery)
- Extension to low-power-profile operation
- Diversity in communication means to one or more monitoring locations



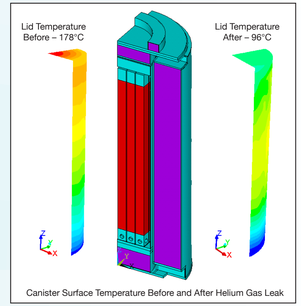
CURRENT DESIGN

- Expandable sensor platform
  - Multiple external thermocouples
  - Loop seal
  - Radiation (Gamma + Neutron)
  - 3-Axis Accelerometer
- Multiple power sources
  - PoE
  - Battery backup
- Multiple technologies that ensure a fault-tolerant communication system
  - LAN via Ethernet
  - Wireless Mesh Network
  - Cellular
  - Satellite
  - Secure encrypted communication



SPENT FUEL CANISTER MONITORING

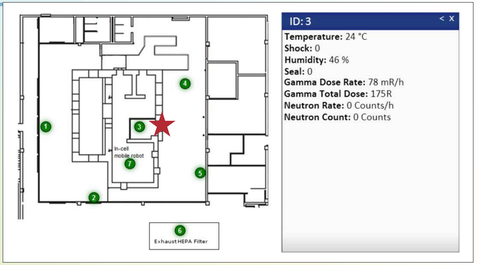
- Manage aging of canisters in dry storage
- Remotely monitor radiation levels to reduce worker exposure
- Monitor outside surface temperature of canister to detect breaches
- Monitor air flow to determine obstruction of ventilation



Canister Surface Temperature Before and After Helium Gas Leak

FACILITY MONITORING

- Designed to monitor multiple hazards to facility
  - Hydrogen levels
  - Vibrations/shocks
  - Humidity
  - Radiation (Criticality)
  - Camera and thermal imaging
  - Pool water level
  - Motion Detection
- Rugged shell to protect against physical hazards
- Incorporated multiple redundancies to provide functionality in case of primary power/communication failures



BENEFITS AND FUTURE

The ARG-US RAMM system allows users to remotely monitor critical environment parameters for nuclear facilities, such as DCSS. The modularity of the RAMM units enables the facility to tailor the exact sensor profile to fit the needs of the monitored area. By utilizing redundant forms of power sources and communications mediums, the RAMM unit is able to monitor and report environmental data collected even during a disruptive accident. The ability to remotely monitor these facilities and systems will allow for a reduction of unnecessary exposure to workers, in support of the ALARA guidance. Prototype RAMM units are in production, and locations for field testing are being considered.

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