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Development of a first-look cadmium zinc telluride detector for the Radionuclide Aerosol Sampler Analyzer

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A novel first-look cadmium zinc telluride (CZT) detector is being developed by Pacific Northwest National Laboratory (PNNL, USA) in collaboration with General Dynamics – Mission Systems (GD-MS, USA). The compact gamma-spectrometer is designed to be installed within the air intake plenum of the Radionuclide Aerosol Sampler Analyzer (RASA) design of International Monitoring System (IMS) radionuclide stations. It provides real-time measurements of the radionuclides collecting on the filters in advance of the standard High-Purity Germanium (HPGe) measurement made 48 – 72 h after sample collection. These measurements are made every 15 minutes, and may provide an early indication of radionuclides relevant for Treaty monitoring purposes, supporting nuclear event discrimination and atmospheric transport modelling (ATM) projections. During the high-activity conditions that might be expected during a nuclear accident, it would also provide a measurement of dose rate useful for protecting the station operator and other personnel (including the dose expected from activity collected on the filters). The first-look detector would also safeguard against contamination of the RASA, and may be used to trigger reduced air flow and collection time, to limit the activity being collected onto the filters, and measured by the HPGe.

Promotional text

The first-look CZT detector aims to advance the capabilities of the radionuclide monitoring stations of the IMS. It is aligned to Theme 3: Verification Technologies and Technique Application – Design of Sensor Systems and Advanced Sensor Technologies (T3.1).

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