Lawrence Livermore National Laboratory

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SOFTWARE SOLUTION FOR RADIOACTIVE CONTRABAND DETECTION

The statistical radiation detection system (SRaDS) is an innovative software solution that nonexperts can use in a gamma detector to rapidly and reliably detect radionuclides. Improving security at U.S. transportation portals is one of the nation's most difficult technical and practical challenges because the systems developed for screening cargo must operate in real time without disrupting legitimate commercial shipping activities.

Rapid and Reliable Radionuclide Detection

The software provides highly developed quantitative statistical analysis of the data received in real time. Exploiting Bayesian algorithms, the smart processor examines each photon—one by one—as it arrives and then "decides" whether a radionuclide is present based on selected parameters. This capability is not available in conventional detection systems, yet it is essential in the successful identification of radionuclides in low-count situations when measurement time is short and demand for reliability is high.

Integrates into Any Gamma-Detector System

SRaDS can easily be integrated into any gamma-detection system, including large stationary detectors at transportation portals that help search for contraband radioactive material in moving vehicles, cargo containers, and railroad cars. The software works equally well in pedestrian monitors used to combat illicit trafficking of radioactive material through customs, border crossings, and limited-access areas. The technology can also be installed in portable gamma detectors used by first responders to determine radiation risks associated with local nuclear emergencies.

The statistical radiation detection system (SRaDS) is an innovative software solution that can easily be integrated into any gamma-detection system to combat illicit trafficking of radioactive material through customs, border crossings, and limited-access areas. SRaDS identifies radionuclides in low-count situations when measurement time is short and demand for reliability is high. The processed data are displayed in intuitive plots showing results that a nontechnical user can interpret.

Development team for SRaDS: (from left) Brian Guidry, Kenneth Sale, Michael Axelrod, Thomas Gosnell, James Candy, Sean Walston, David Chambers, Eric Breitfeller. (Not shown: Dennis Slaughter, Jerome Verbeke, and Stanley Prussin [UCB].)

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