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Gamma-Ray Imaging for Assessing Radiation Source Distributions in On-Site Inspection

The Lawrence Livermore National Laboratory has developed and commercialized many advanced radiation detection technologies that have become widely adopted and are used around the world. One of our most recent developments is the Germanium-Gamma-Imager (GeGI) System. This novel system combines a mechanically-cooled segmented planar HPGe detector with an optical camera. The GeGI, identifies the radionuclides through traditional gamma-ray spectroscopy, computationally determines the spatial distribution and places that distribution atop an optical image of the same area. This enables the user "to see" otherwise invisible radioactivity and its distribution. We computed the performance of the GeGI against the IFE2014 scenario (10x60Co sources, 10 MBq each, distributed over a few hundred m2 and slightly buried in soil at about 10-15 cm). We assessed several different distances from the perimeter of the source plane of polygon 29 and also the cliff side. For some of the distances examined, the GeGI would have both detected the presence of the sources, and identified a number of hot spots. This presentation will describe the hardware and the results of the model-based assessment of the expected performance against the IFE14 scenario. Work performed under the auspices of the U.S. DOE by LLNL under Contract DE-AC52-07NA27344, LLNL-ABS-716590.

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