EPA's Integrated Rad Remediation Decision Support Tool (IRRD-ST) to Optimize Radiological Cleanup Decisions

Bruce Letellier | *Serco Inc.*

As part of its mission to protect human health and the environment, the U.S. Environmental Protection Agency (EPA) conducts characterization efforts to understand the type, extent, and level of contamination resulting from a chemical, biological, or radiological (CBR) incidents. For radiological incidents, gamma-ray cameras are a prompt and easily field deployable solution that combine wide-angle optical images with radiation intensity contours. The composite images provide intuitive evidence of contamination location and magnitude within a room, but optical distortion complicates visual interpretation of size and scale. EPA uses the Hot Spot Calculator (HSC) to optimize radiological cleanup decisions in conjunction with composite images to estimate contaminated areas and identify isotopes and surface types affected in support of estimating costs associated with various decontamination technologies needed to remediate the contaminated area.

Currently, the HSC requires extensive external computer-aided design (CAD) manipulation to process the composite images. This presentation will describe an enhanced approach that combines semi-automated image processing with radiation physics to achieve greatly improved accuracy while minimizing the need for manual manipulation. Contaminated area estimates that account for optical distortion, geometric attenuation, scattering in air, and oblique source planes are more representative and accurate. A software-based utility feature is being developed to streamline the processing of the 2-D gamma-ray imagery for the purpose of obtaining more accurate and more efficient contamination area estimates. The improved methodology for processing composite gamma-ray camera images and extracting contamination area estimates reduces the amount of user input and minimizes the number of user decision steps and supports accuracy and efficiency improvements that can be implemented during future field survey data collection.