Contribution ID: **231** Type: **Oral**

Gamma imaging for On-site Inspection: Reconstruction of an extended source in a restricted-access zone

Wednesday, 26 June 2019 17:30 (15 minutes)

Under the Comprehensive-Nuclear-Test-Ban-Treaty a State Party can request an on-site inspection to establish whether or not a nuclear explosion has been carried out. Gamma radiation measurements would form a key component of the operation. However, the inspected State Party may declare up to 50 km^2 of restricted-access sites (RAs) each of area up to 4 km^2. We have developed the Silicon photomultiplier-based Compton Telescope for Safety and Security (SCoTSS) gamma imager and survey spectrometer. In a mobile survey along the perimeter of a restricted-access site, SCoTSS can perform a kind of triangulation to work out the distribution of radioactivity inside. This scenario has been enacted experimentally with controlled distribution of 10 GBq of radioactive lanthanum in an L-shaped pattern of area 3,200 m^2 followed by perimeter survey using the SCoTSS imager. We have developed tomographic methods to reconstruct the distribution of radioactivity using the images from multiple points of view. Despite the imager being constrained to locations on the ground over 200 m from the source, it is possible to localize the distribution of the radioactivity. These experimental results and methods will be presented and their potential application to restricted-access sites in on-site inspection will be discussed.

Primary author: SINCLAIR, Laurel (Canadian Hazards Information Service, Geological Survey of Canada (GSC))

Presenter: SINCLAIR, Laurel (Canadian Hazards Information Service, Geological Survey of Canada (GSC))

Session Classification: T2.2 Challenges of On-Site Inspection

Track Classification: Theme 2. Events and Nuclear Test Sites