Advapix TPX3 detector with Realsense L515 Lidar Camera for Localization and Characterization of Hotspots.

Mattias Simons¹*, David De Schepper²,³, Lowie Brabants¹, Eric Demeester²,³ and Wouter Schroeyers¹

1. Hasselt University, CMK, NuTeC, Nuclear Technology – Faculty of Engineering Technology, Agoralaan Building H, B-3590 Diepenbeek, Belgium
2. KU Leuven, Faculty of Engineering Technology, Department of Mechanical Engineering, Campus Diepenbeek, ACRO Research Group, Wetenschapspark 27, 3590 Diepenbeek, Belgium
3. Core Lab ROB, Flanders Make @ KU Leuven, Belgium

* Corresponding author, mattias.simons@uhasselt.be

Introduction

In nuclear decommissioning projects, localising and characterising hotspots is critical to prevent risks. Compared to classical measurement devices, a Compton camera can extract directional information about the hotspot, eliminating the need for repeated measurements. An advacam tpx3 camera with 1000 µm CdTe was used as a single-layer Compton camera, and a Realsense L515 lidar camera was added to this setup. The lidar point cloud was superimposed with the Compton camera to visualise the radioactive sources in 3D and measure the source-to-detector distance. Activities were estimated using this source-to-detector distance.

Materials and Methods

Superposition and alignment point cloud

Results

Activity estimated
- ±130% error
- Activity > 14 MBq
- Distance > 3,95m
- Positional error > ±10 cm
- Measurement time > 5 hours

Conclusions

This method has several advantages
- improved visualisation with the lidar camera.
- a 360-degree measurement of the room possible
- Improved activity estimation.

Further research will optimise measurement times and measurement parameters to increase sensitivity of the setup.