

## **T2.2-O1. Getting Closer to Surface Ground Truth Zero (GT0): Enhanced Geo-Positioning and Geological Site Characterization of Underground Nuclear Test Sites such as in North Korea Using Openly Available Geospatial Tools like Google Earth**

This presentation describes a new geomorphometric approach that enhances understanding of underground nuclear test sites, illustrated by the North Korean exemplar, including the geospatial context of the previously recorded event locations and their geologic setting. The “real world” geo-positional accuracy (beyond that possible using only relative re-location) can be brought to within a few hundred meters of actual locations (particularly in areas of high topographic relief) through combination of the seismic data with openly available geospatial tools like Google Earth, augmented by reasoned analysis of additional commercial satellite imagery (acquired both pre-, and post- test). That improved precision effectively meets the criteria for ground truth zero (GT0) in a way not previously obtainable by other applicable remote methodologies when surface disturbances are lacking for tunnel tests. Moreover, such refined geo-positioning provides a more accurate understanding of the likely host rock through geomorphometric correlation with openly available geologic map data. Finally, the topographic elevation data that is derivable from such geospatial tools also provides an empirical basis for determining the likely overburdens associated with each event (and therefore also the likely vertical depths of burial) for more precise seismic energy release derivations (given the recorded seismic moments of those events).

**Primary author:** PABIAN, Frank (European Commission, Joint Research Centre)

**Presenter:** PABIAN, Frank (European Commission, Joint Research Centre)

**Track Classification:** 2. Events and their characterization