

Mapping thermal imaging to 3D

Using visual localization

Petri Honkamaa, Paul Kemppi
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DORADO WP3 Technology Presentation



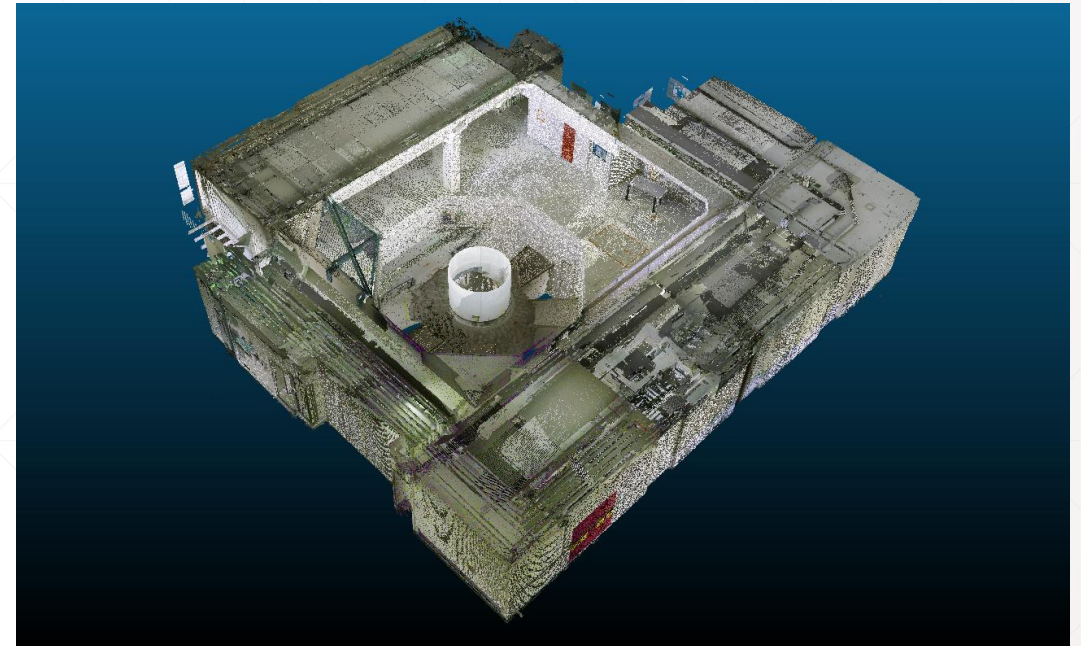
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Mapping sensor data using visual localization

- Novel method to align photo directly with a LiDAR pointcloud
- Implemented as a service with **REST interface**
- Supports multiple concurrent spaces (input point clouds)
- 6 DoF cm-level indoor positioning for any given camera
- Project image pixels to the 3D scene



The only input for the visual positioning is the laser-scanned point cloud of the environment

Visual localization challenges

- **Appearance variations:** e.g., illumination variations, seasonal changes
- **Different viewpoints:** Different distances and viewing angles
- **Dynamic scenes:** Objects moving or removed / added
- **Poor salient features:** plain walls, no details, repetitive structures, reflective/shiny surfaces
- **Photography limitations:** motion blur, rolling shutter effect, ...

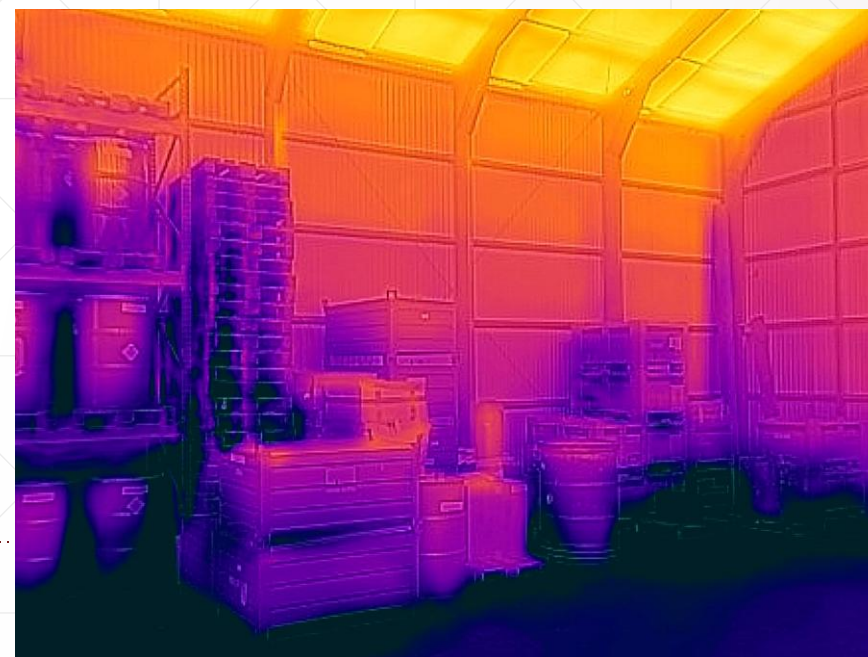
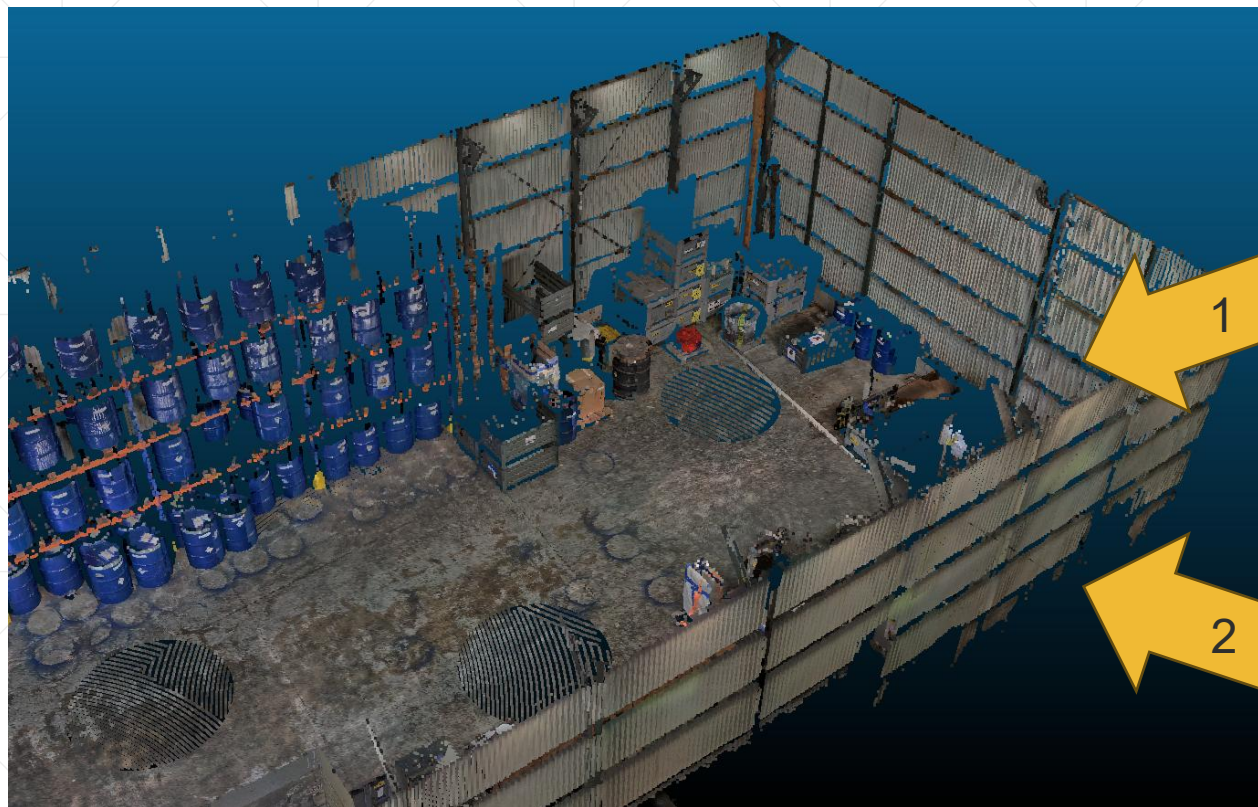


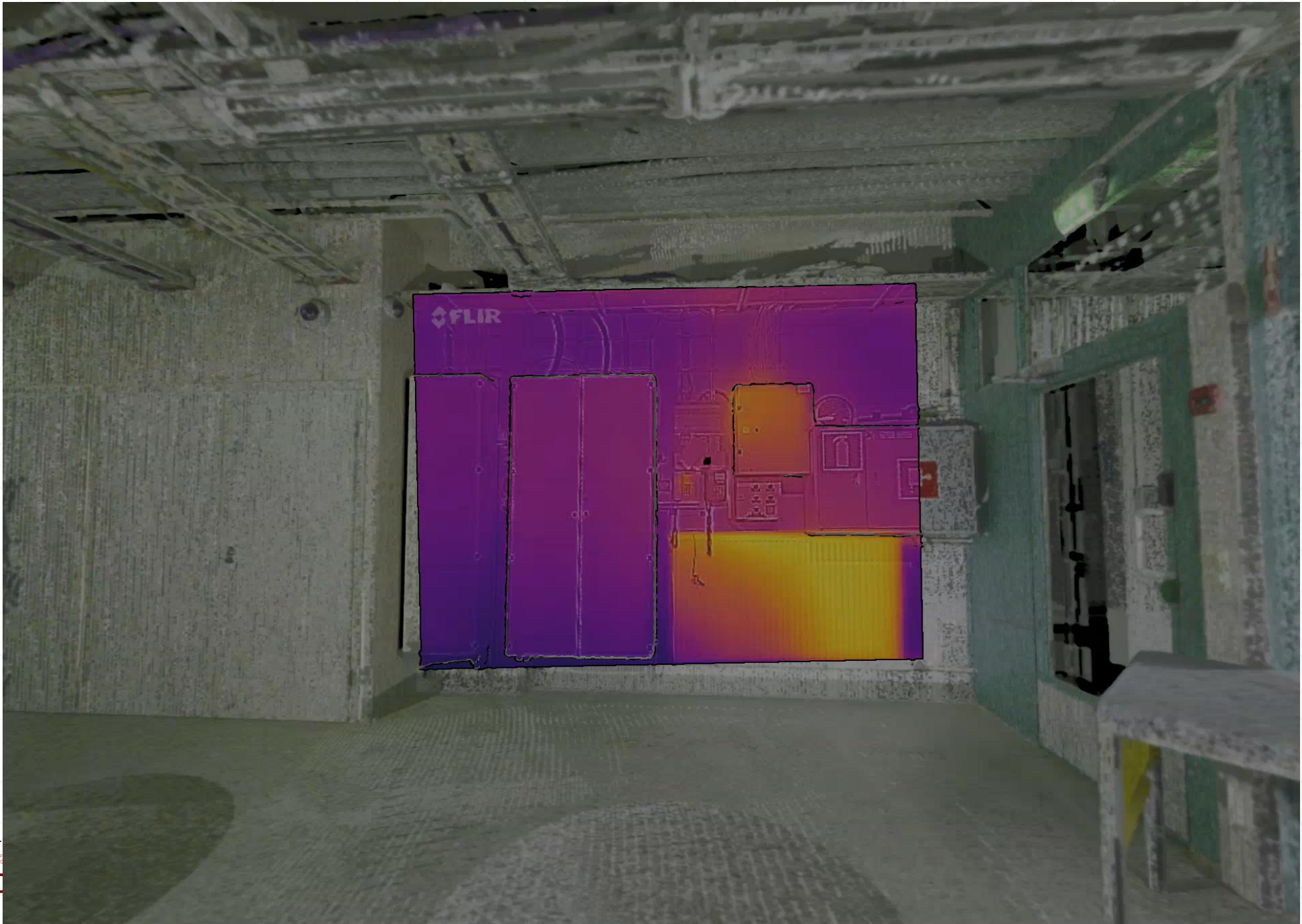
2D feature matches for an image pair in Aachen Day-Night dataset with hLoc toolbox

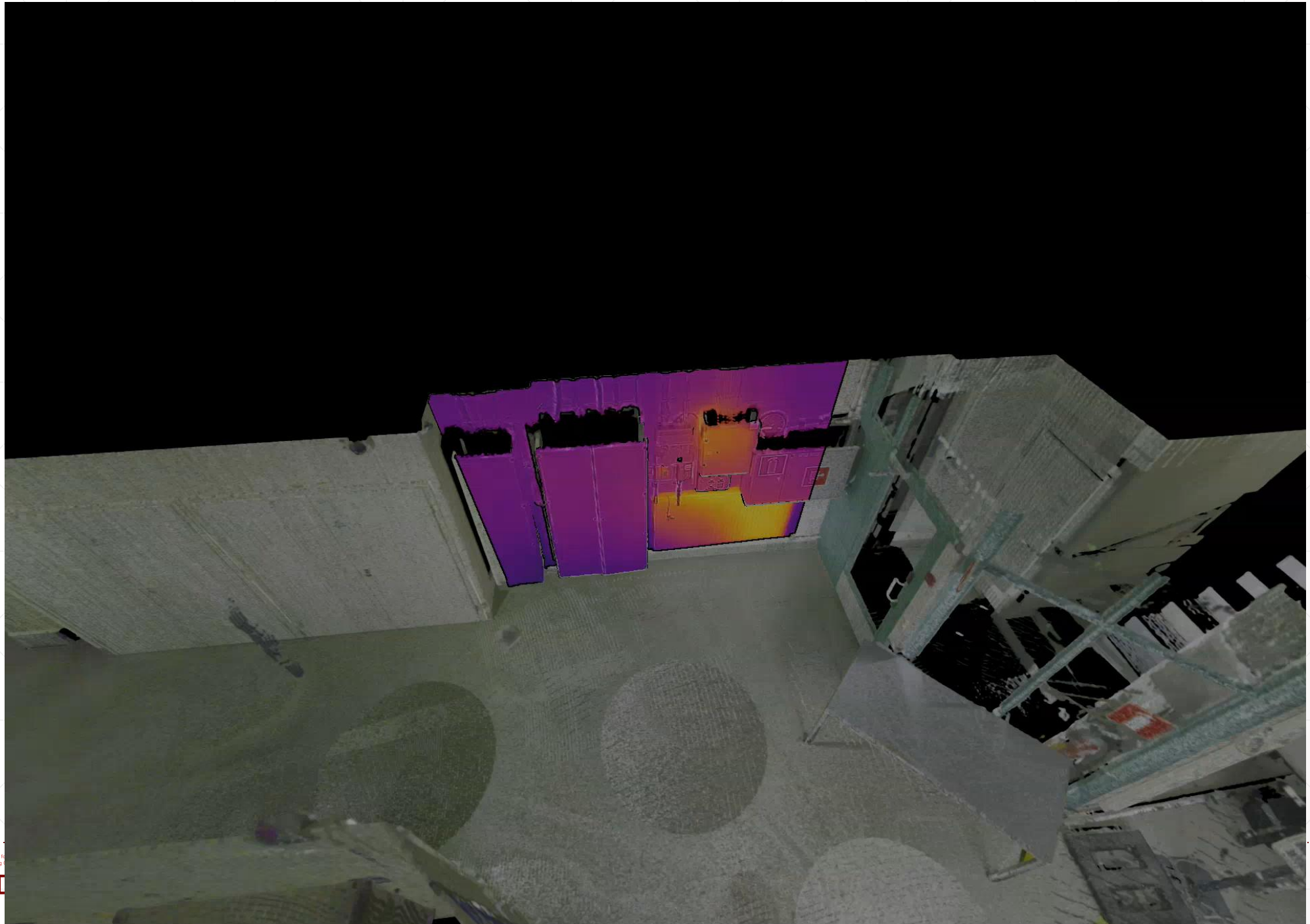
Thermal images

- Use of FLIR One Edge Pro thermal camera mounted on Android phone
- MSX is a FLIR imaging technology combines together the visual and thermal spectrums.
- Steps
 1. Estimate the 6 DoF pose of visible light image using visual positioning
 2. Estimate the 6 DoF pose for MSX image using pose of the visual image as an initial guess
 3. Project MSX pixels to 3D









Thank you
