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DIGIPURKU- LASER SCANNING & BIM MODELLING

1. *Trimble X7 Scanner Tips/Procedure*

- Use with FieldLink software in the tablet.
- Scanning configuration: low density, fast image, automatic lightings (2:35mins/scan)
- Placement of the scanner: optimize the number of scanning by efficiently place the scanner at a spot where the scanner can capture as much information as possible.
- If the scanning site has large sum of areas, it would be more practical to separate each floor to an individual project workspace (to avoid unforeseen crashes)
- Refine the project after the clouds are pre-registered (making it ready for export for modelling)

2. *Trimble RealWorks- Cloud Registration & Export*

- Reference playlist: Basic Registration Workflows - Trimble RealWorks (youtube.com)
- Useful technical support sources:
  + BuildingPoint Finland (BuildingPoint Finland - solutions for construction)
  + Technical contact person: Tuomas Anttila (tuomas.anttila@buildingpointfinland.fi) & Tommi Tikka (tommi.tikka@buildingpointfinland.fi)

3. *AutoDesk Revit- Modelling Process*

- Import *.rcp* files from Trimble RealWorks
- Have supporting materials (floor plans, elevation plans, material property catalogues, etc.) for cross-checking/verifying scan registrations.
- Start drawing/modelling based on the information obtained.
- Export as *.ifc* (for Trimble Connect & material property assessment)

4. *List of required supporting documents:*

- floor plans (containing dimensions, grid line, etc.)
- elevation plans (containing different level of the floors, sea levels, etc.)
- structural types, structural drawings if possible

Date: 25.03.2024 *Written by: Mean, Rithi Reach*

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NOTE:

The flow of file types:

.tzf (raw scan files) → *.rwp* (Trimble RealWorks project files) → *.rcp* (project cloud import for Revit) → *.rvt* (Revit modelling project files) → *.ifc* (Trimble Connect import)

Revit Modelling Procedure

The following steps (IN ORDER) for setting up a Revit project file are necessary to be conducted before starting to model:

- integrate localization package in Revit project workspace. (package files and instructions available in hard drive)
- import the registered point clouds (*.rcp*). (available in hard drive)
- insert floor plans to the workspace. (floor plans (*PDF/DWG*) to be obtained from the local authorities)
- modify floor plans to a correct scale. (Scale: 1/100)
- modify the grid line according to the floor plans.
- align the registered point clouds to the floor plans and the modified grid line.
- lock the references (floor plans & point clouds), so that origin point/coordinate does not differ.
- start the modelling according to the floor plans and the point clouds.

References to be linked (or reloaded) in Harakkamäki Revit project file:

- Harakkamäki building:
  + *Harakkamäki.rcp (containing the exterior part and all floors of Part E)*
  + *Part B all.rcp (containing all floors of Part B)*
  + *Part C all.rcp (containing all floors of Part A, p.s. Part C here = Part A)*
  + *pohja talo 1 ABE 1 krs.pdf*
  + *pohja talo 1 ABE 2 krs.pdf*
  + *pohja talo 1 ABE 3 krs.pdf*
  + *pohja talo 1 ABE 4 krs.pdf*
  + *pohja talo 1 ABE 5 krs.pdf*
  + *pohja talo 1 ABE 6 krs.pdf*

NOTE:

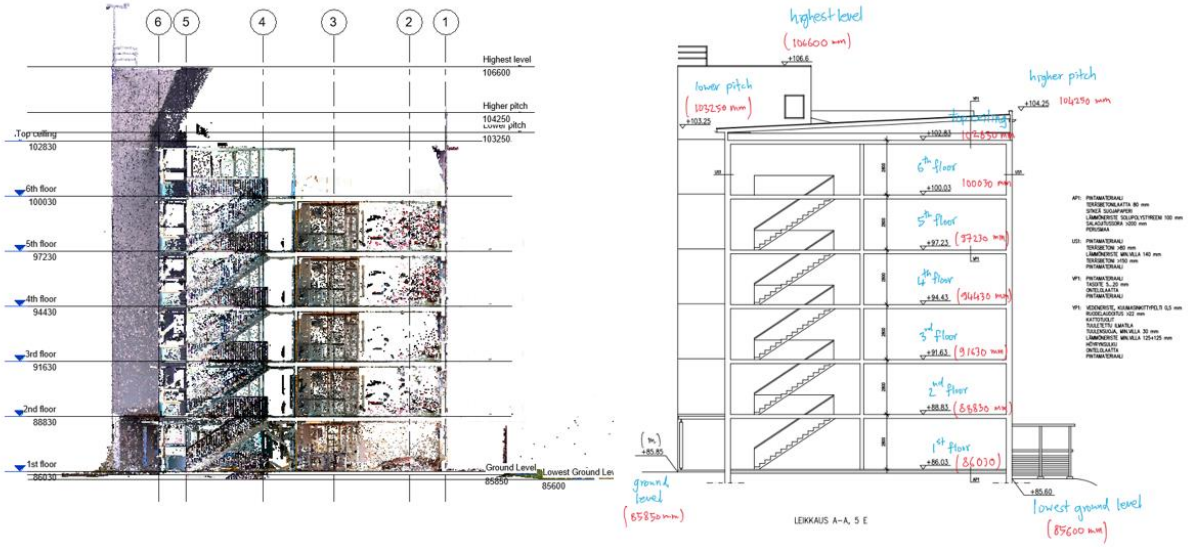
BIM Model- Harakkamäki.rvt has already been set up for further modelling. It might be possible that the Revit software asks to reload the reference links, as the reference files locate in a different path.

Parts of Harakkamäki building have also been modelled in *Harakkamäki.rvt* (available in the hard drive). This file can be used to copy the modelled parts (Part E and a bit of Part B) to *BIM Model- Harakkamäki.rvt.*

However, the material of structure elements from *Harakkamäki.rvt* need to be refined to the correct building materials when copied to *BIM Model- Harakkamäki.rvt*.

Front view of Harakkamäki Building in Revit (integrated with the localization package)

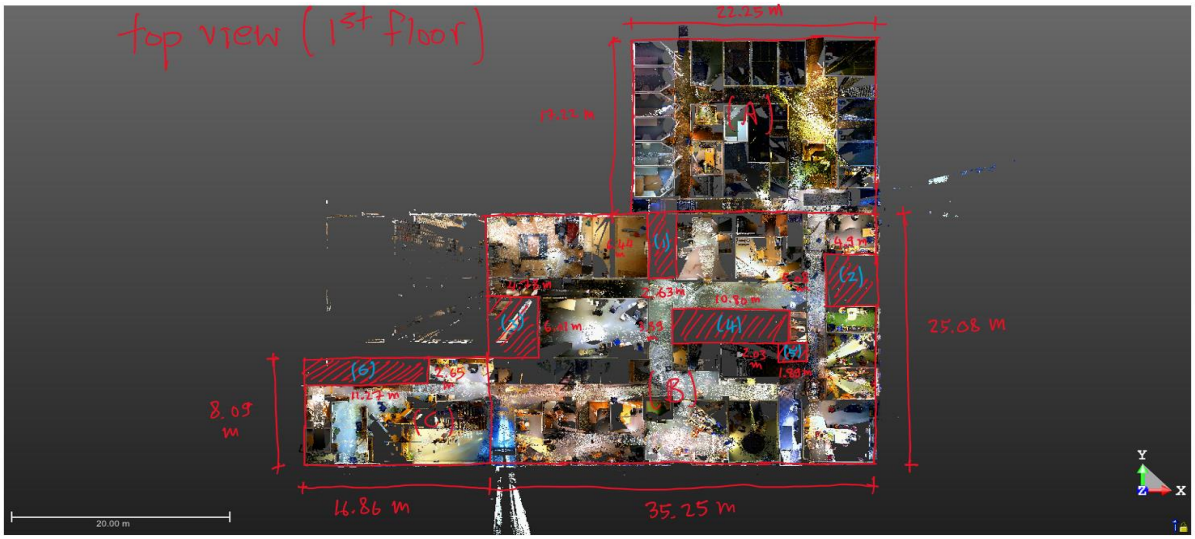
1st Floor Plan (Part E) in Revit (modified grid line, floor plan underlay, point clouds on top)



Section A-A of Harakkamäki Building (Scale: 1/100) (coordinates with the sea level)

References to be linked in Järvenpää Revit project file:

- Järvenpää building:
  + *Jarvenpaa- Outside 2.rcp (based on scanning data from 21.03.2024, 2nd site visit)*
  + *Jarvenpaa- 1st floor.rcp*
  + *Jarvenpaa- 2nd floor.rcp*
  + *Jarvenpaa- 3rd floor.rcp*
  + *Jarvenpaa- 4th floor.rcp*
  + Floor plans (to be obtained from the Järvenpää authorities)



2D View- 1st Floor Point Cloud

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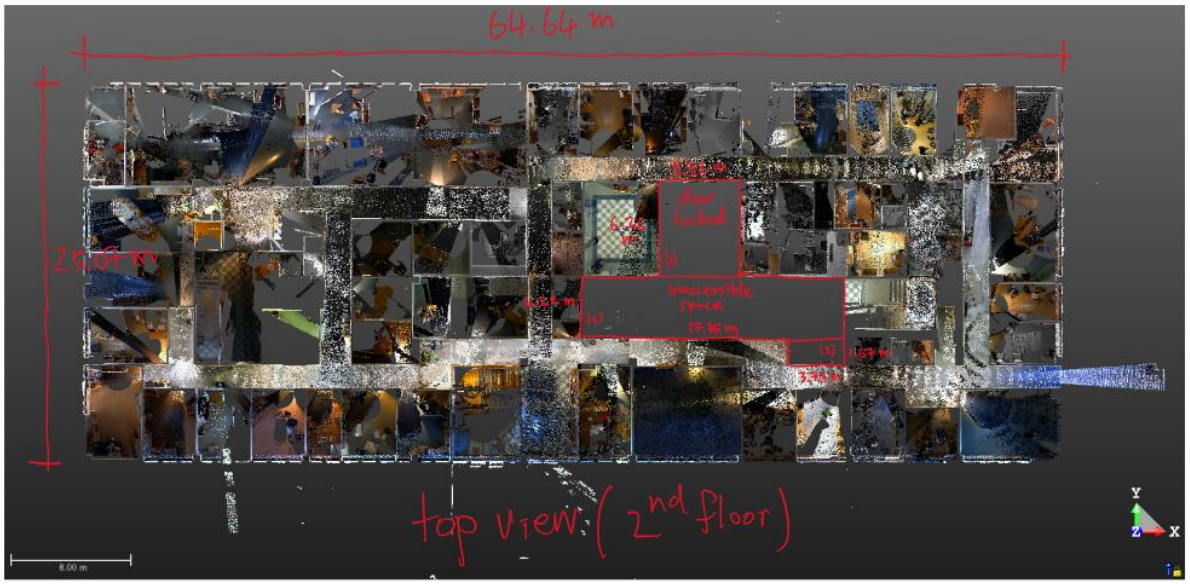
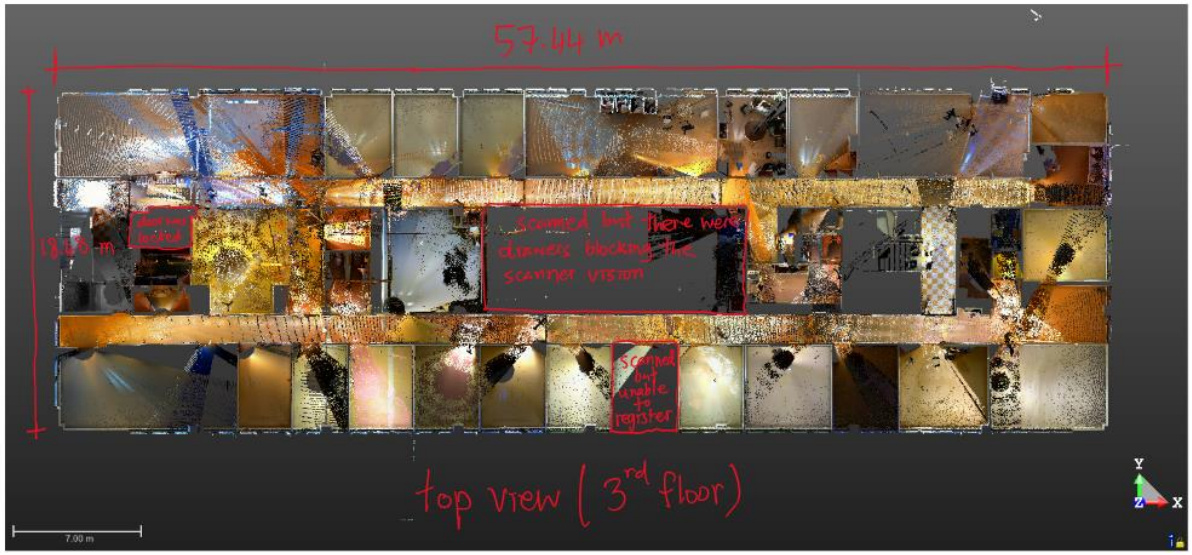


2D View- 2nd Floor Point Cloud



2D View- 3rd Floor Point Cloud

2D View- 4th Floor Point Cloud

3D View of the Exterior (registered from scanning data from 21.03.2024, 2nd site visit)