

LoD2 Building Data Production in Estonia

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Estonian Land Board
13.11.2023

tech stack

Hardware

Airplane

Cessna Grand Caravan 208B



Hardware

Airplane

Cessna Grand Caravan 208B



Lidar scanner

Riegl VQ-1560i



Hardware

Airplane

Cessna Grand Caravan 208B



Lidar scanner

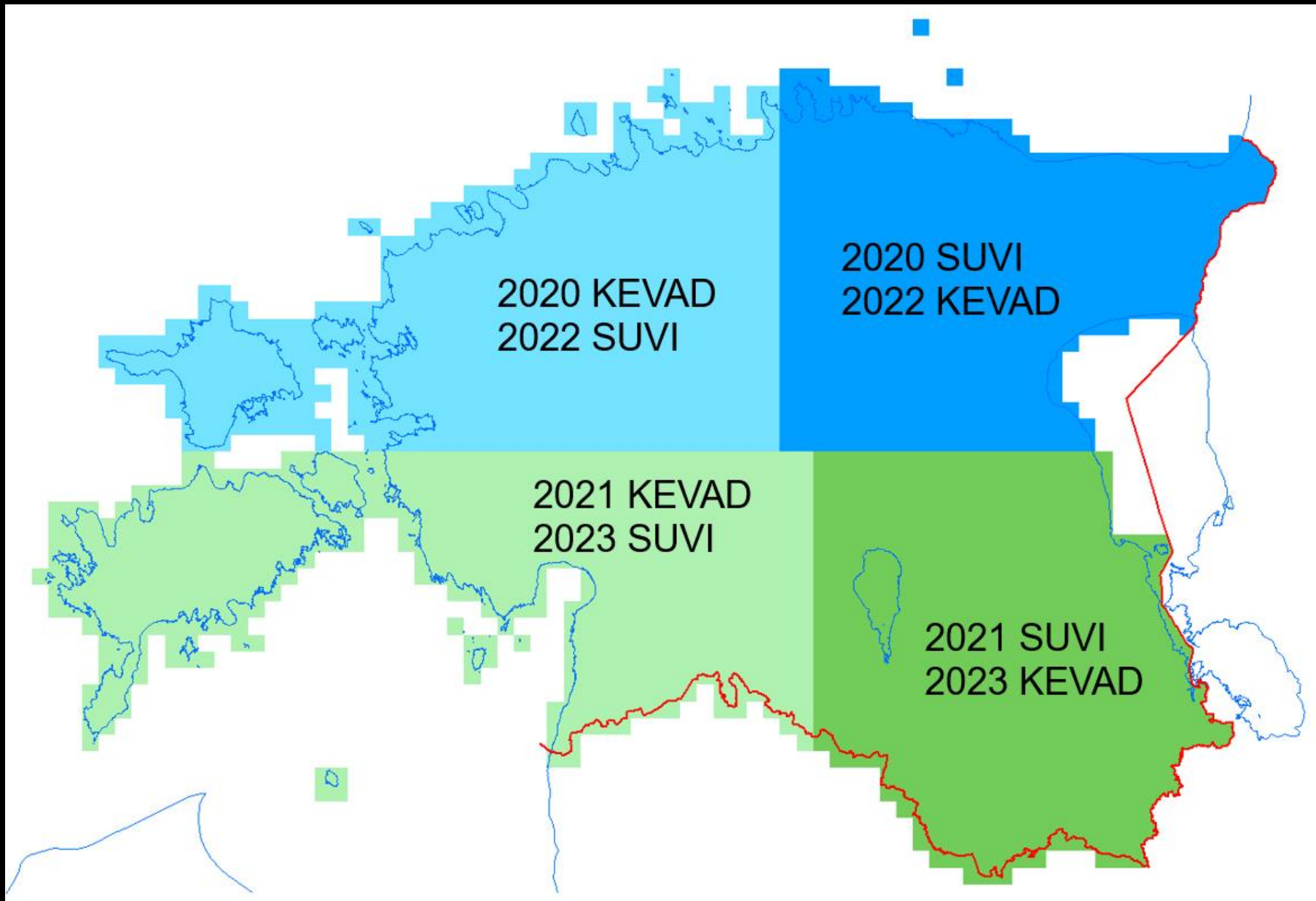
Riegl VQ-1560i



Image sensor

Leica ADS100-SH100





Flight projects schedule for 2020-2023 (KEVAD – spring, SUVI – summer)

Software



Software



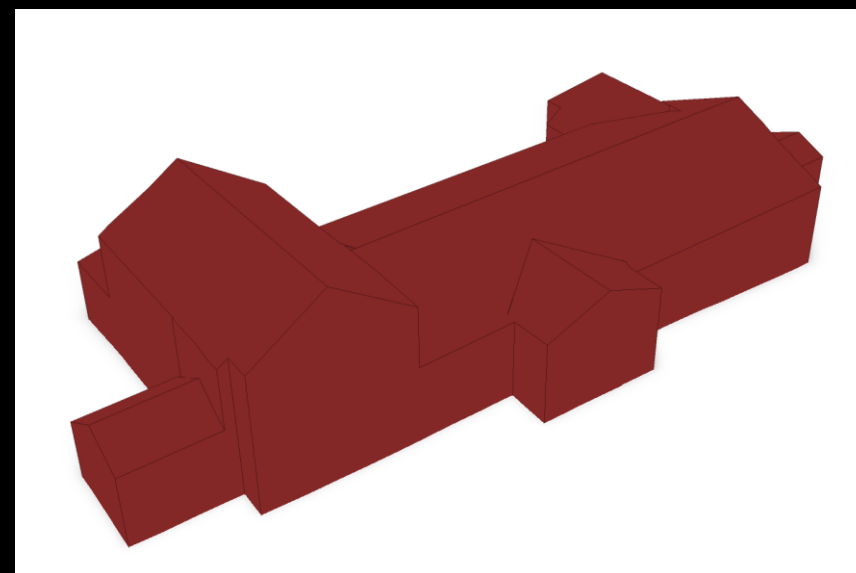
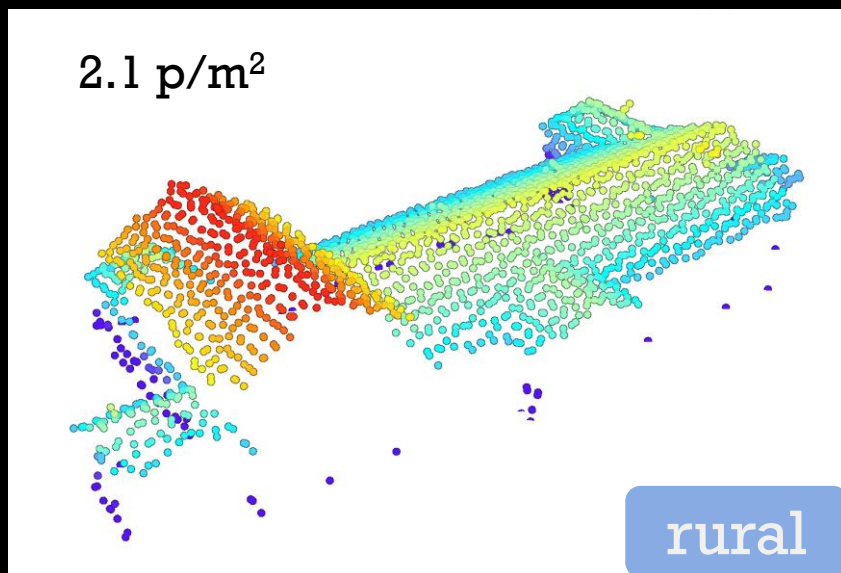
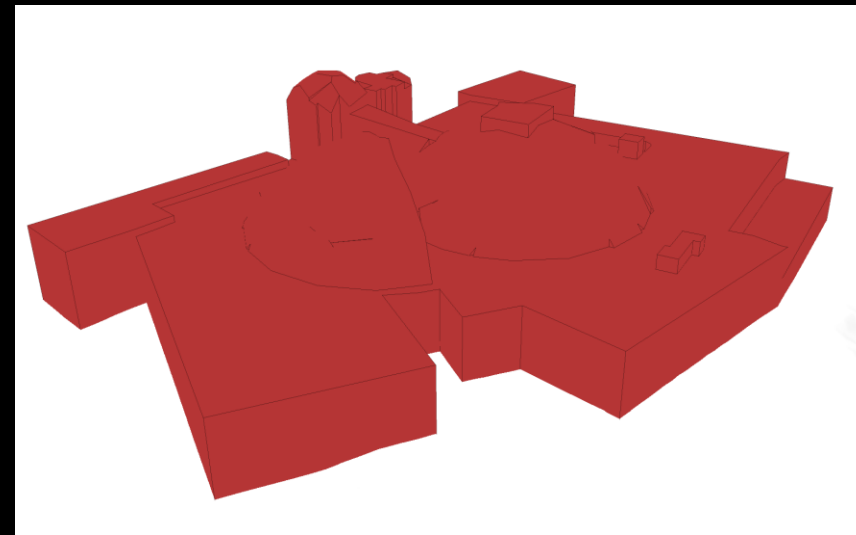
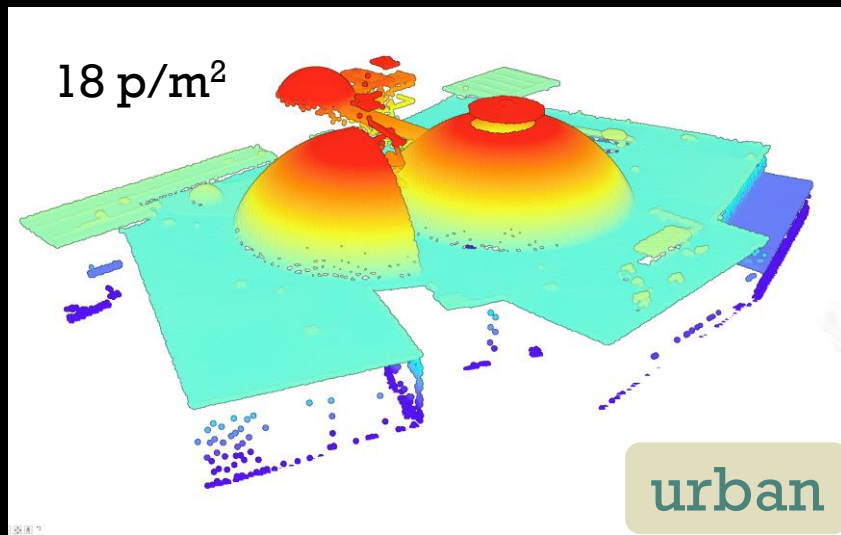
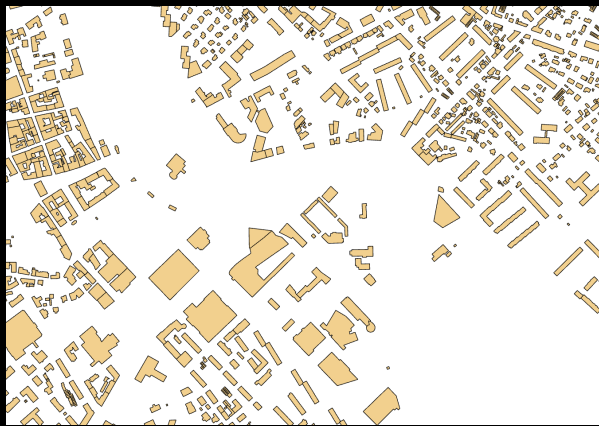
FME:



data production



Estonian Topographic Database
ca 900 000 building footprints





St. Paul's Church of Tartu



St. Paul's Church of Tartu



Geoflow, 2022



TerraScan, 2022



TerraScan, 2020

Processing LoD2 buildings in GIS

- **Problem:** initially generated buildings lack attribute data
- **Solution:** we have created a data processing workflow to match LoD2 buildings with Estonian Topographic Database (ETD) footprints
 - Fixes problems with courtyards and side-by-side buildings in old town
- Using Esri's arcpy module
- 90% of the buildings in ETD have a LoD2 representation

```
cu_codes = []
for cu_code in self.cadastral_code:
    href_code = fr"<a href='https://xgis.maaamet.ee/ky/{cu_code}' target='_blank' rel='nofollow noopenener'>{cu_code}</a>"
    cu_codes.append(href_code)

# Converting to string
self.cadastral_code_http = ' '.join(cu_codes)

async def get_ky_code_main(buildings_wo_cu: list[BuildingInfo]):
    """ Async cadastral units address search main """
    :param buildings_wo_cu: buildings with oid and ads_oid
    :return: enriched result
    """
    connector = aiohttp.TCPConnector(limit=MAX_CONNECTIONS)
    async with aiohttp.ClientSession(connector=connector) as session:
        tasks = []
        for b in buildings_wo_cu:
            task = asyncio.create_task(get_ky_code_request(session, b))
            tasks.append(task)

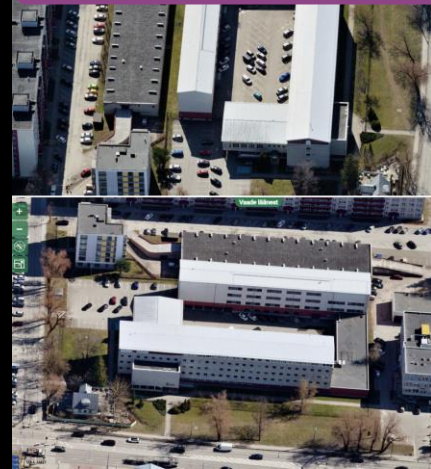
        result = await asyncio.gather(*tasks)

    return result

async def get_ky_code_request(session: aiohttp.client.ClientSession, bi: BuildingInfo) -> BuildingInfo:
    """ Async cadastral units address search url and modding """
    :param session: aiohttp session
    :param bi: building info to be used
    :return: enriched building info
    """
    url = f"{IN_ADS}?address={bi.ads_oid}&seqs=1&ihist=0&results=100" # URL to be called
    found_result = False
    while found_result is False:
        try:
            async with session.get(url) as response:
                result = await response.json()
                found_cu = find_cu_from_result(result, bi.ads_oid)
                # Enriching results
                bi.cadastral_code = found_cu
                return bi
        except asyncio.TimeoutError:
            print(f"Timeout - {url}")

def find_cu_from_result(json_return: dict, ads_oid_to_check: str) -> set:
```

Oblique imagery



QUERY FROM CADASTRAL REGISTER

Address or cadaster identifier

← Previous Search results Next →

Share
Data
Data + map
Web Map Application

Identifier	78407:701:6840
Address	Mustamäe tee 51
Zip code	10621
Settlement unit	Kristline linnaosa
Municipality	Tallinn
County	Harju maakond
Creation date	29. juuni 1998. a.
Change date	21. detsember 2018. a.
Use 1	Ühiskondlike ehitiste maa 100%
Use 2	-
Use 3	-
Area	11690 m ²
Area of land	11690 m ²
Area of land	11690 m ²
Parcel ID	1338501
Creation date	01. märts 1997. a.
Creation method	Välisr. Rahv.
Creation zone	

Hoone

ETAK ID	580275
Tüüp	Elu- või ühiskondlik hoone
ADS Lähiaadress	Mustamäe tee 51
Meja kõrgus	19
Ehitisregister	120221727
Aadressiandmed	ME01087725
Maakataster	78407:701:6840
Kaldaerfotod	ava viide
X-GIS	ava viide
Andmete muutmise aeg	26.01.2022
Geomeetria muutmise aeg	26.01.2022
Leserskanerimise aasta	2020

🔍 Suumi

Hoone 120221727 / Ehitis

Ehitis
Ehitusseadustik
Majandus- ja taristuministri 01.07.2015 määruse nr 57 Ehitise tehniliste andmete loetelu ja arvestamise alused

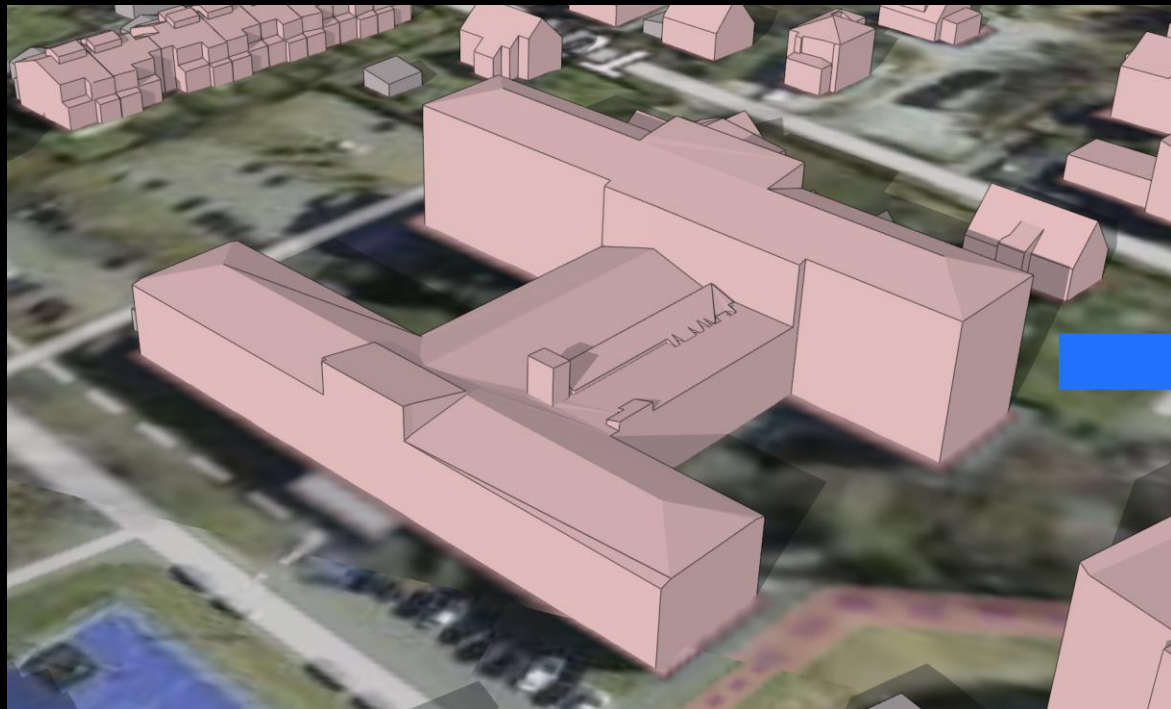
Omandi liik
Omandi liik: kiintsaal
Kiintsaalide olemine koostaja omandis

Ehitiselised andmed
Ehitiselise koodi: 120221727
Ehitise kasutuselevõtu aasta: 1957
Ehitise kasutuselevõtu aasta on oletatav: Ei
Kavandatast kasutuselevõtmise aeg:
Kavandatast kasutamise lõpetamise aeg:
Ehitiselise seisundi kasutuselevõtt: 12201 Büroohoone
Ehitiselise kohtu-aadress: Harju maakond, Tallinn, Kristline linnaosa, Mustamäe tee 51

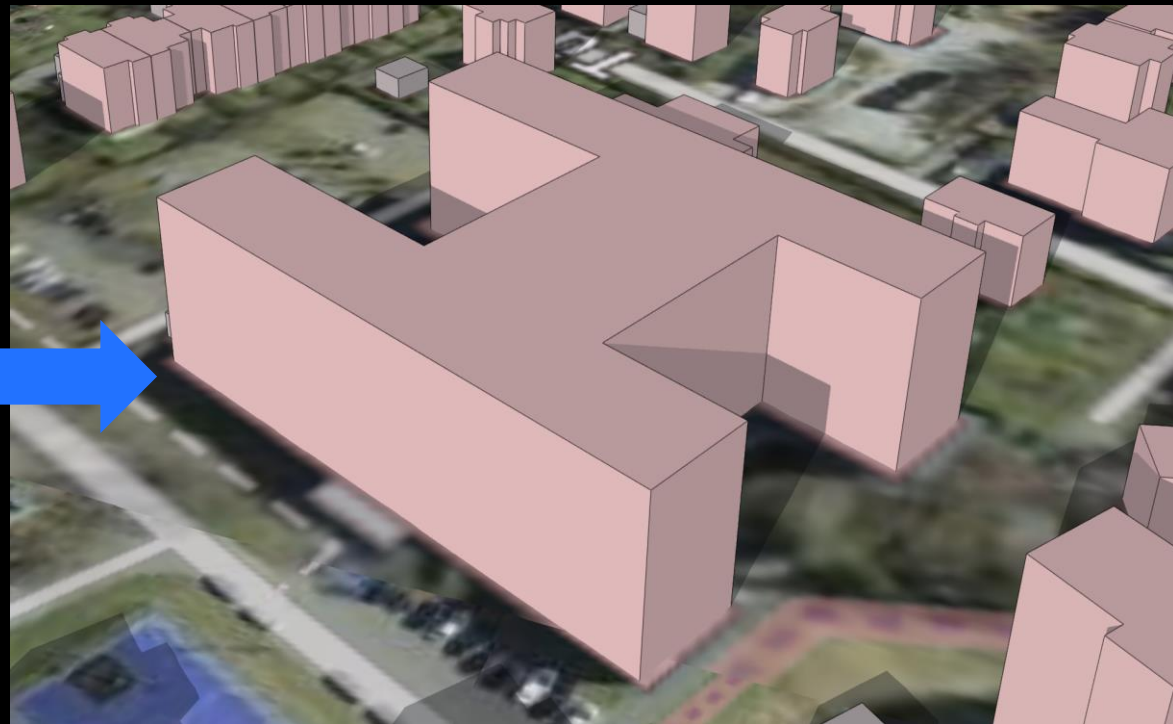
Ehitiselised tehnilised andmed
Ehitisealune pind (m²): 3 652
Maapeetise osa alune pind (m²):
Maapeetise korruste arv: 5
Maa-ala korruste arv:
Absoluutne kõrgus (m):
Kõrgus (m): 18
Pikkus (m): 101
Laius (m): 64,7
Sügavus (m):
Suletud netopind (m²): 10 792,2

Building register

Cadastral register

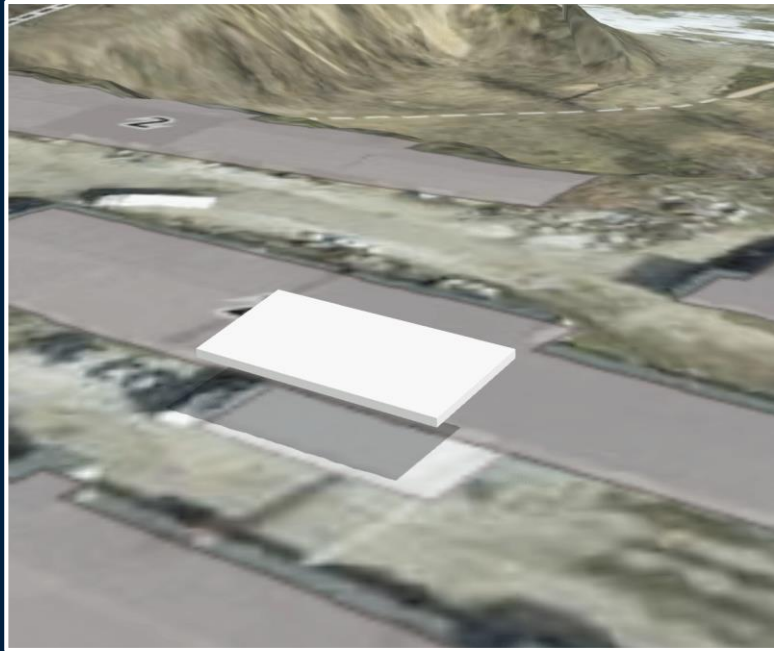


LOD2



LOD1

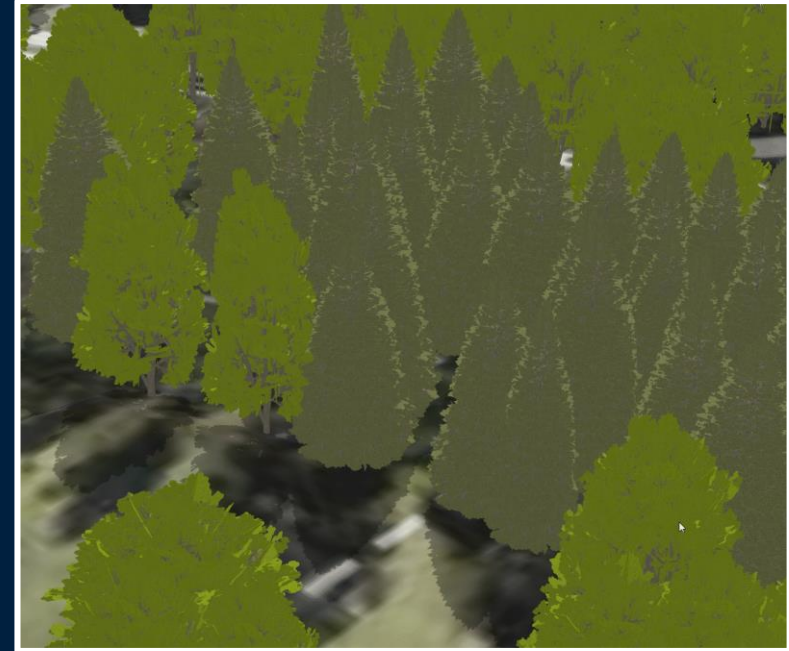
city furniture



roofed areas



mesh



vegetation

Data download and services



LOD1, LOD2 buildings and LOD1 bridges

<https://geoportaal.maaamet.ee/eng/Download-3D-data-p837.html>



ArcGIS Online portal

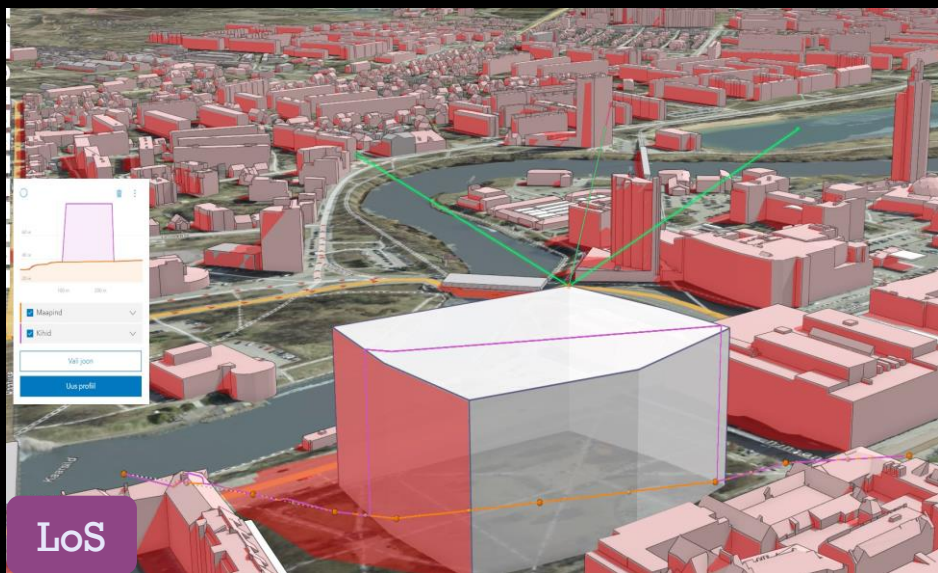
<https://maaamet.maps.arcgis.com/home/index.html>



Map application

<https://3d.maaamet.ee/kaart/>

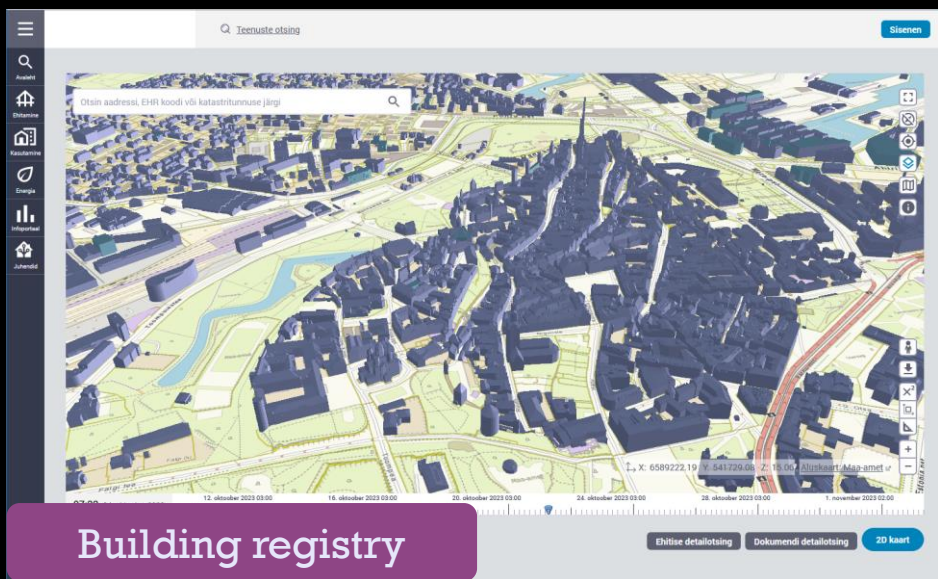
use cases



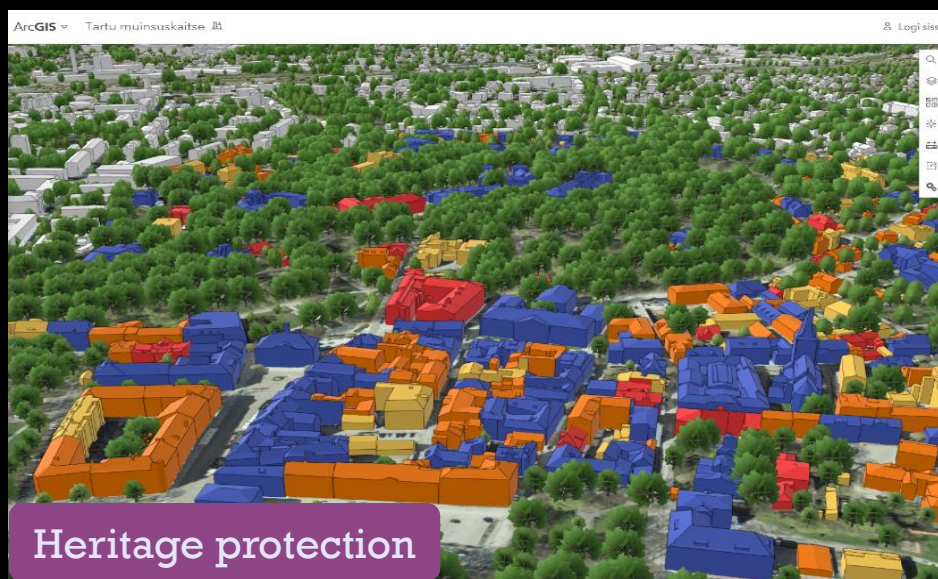
LoS



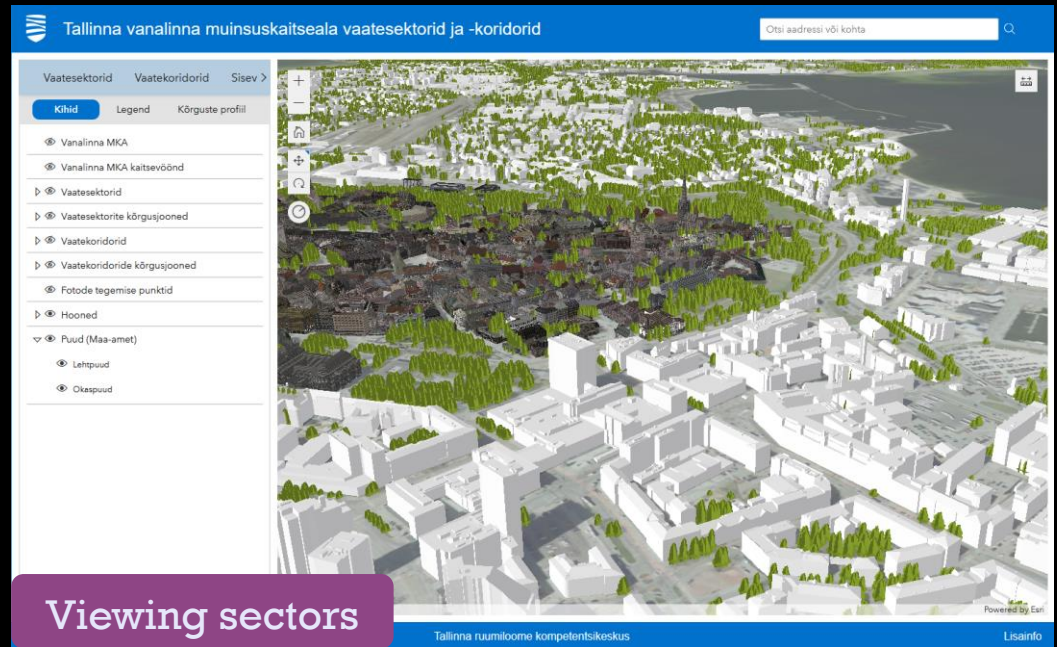
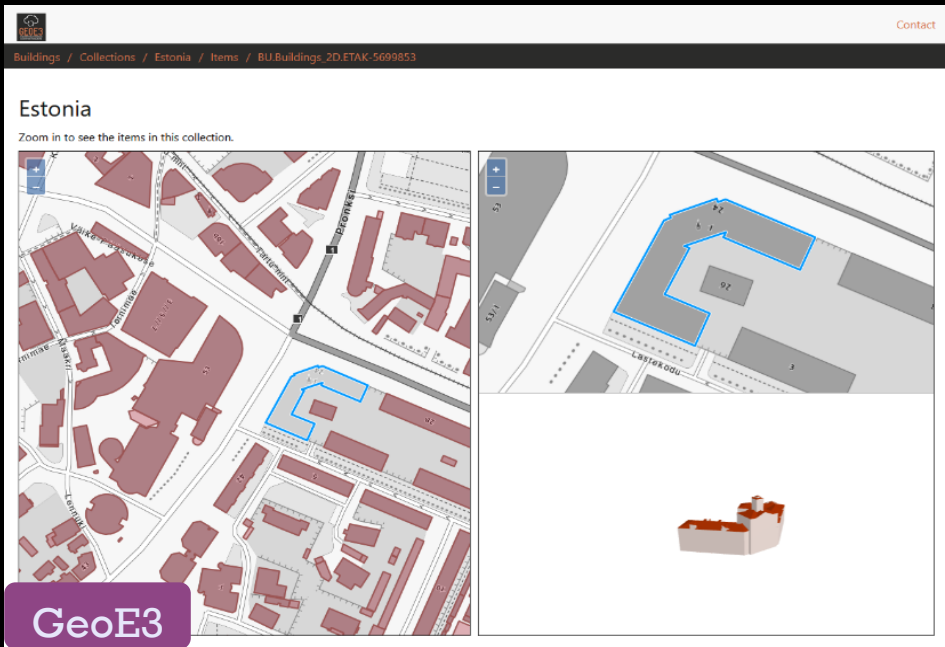
Drone photogrammetry



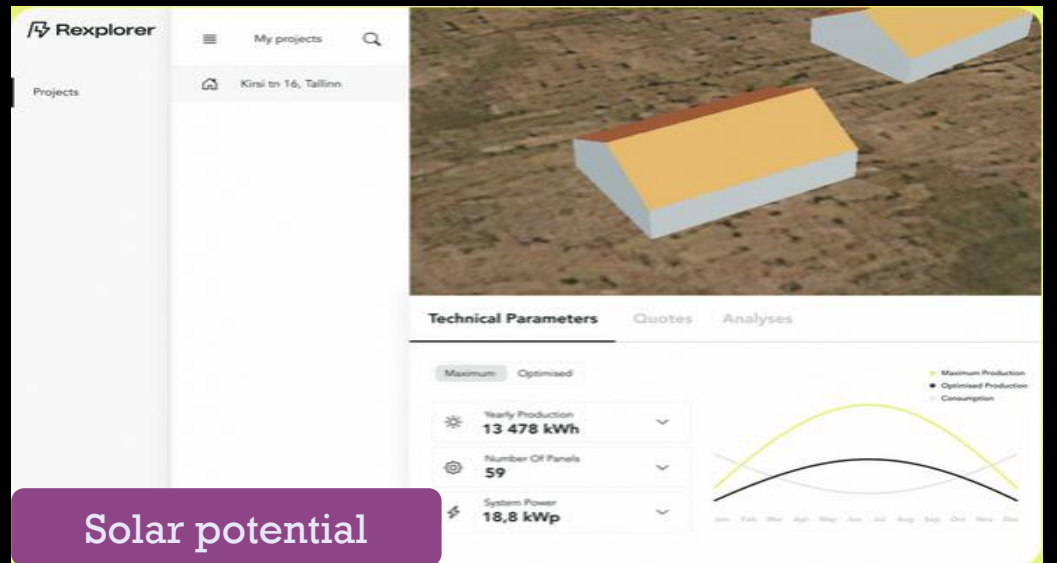
Building registry



Heritage protection



Viewing sectors



Solar potential

webinars



source: mixkit.co

In Estonian



3D ruumiandmete kasu
130 vaatamist • 2 nädala eest

Maa-amet

maa-amet1311 #

19 peatükig

3D RUUMIA
KASUTAMINE

0:00

Sissejuhatu



3D ruumiandmete tutvustus
311 vaatamist

Maa-amet

maa-amet1311

19 peatükig

0:00

Sissejuhatus



imglip.com

1:50

3D andmete saamislugu (lidar,...

6:46

Kõrgusandmed, kõrgusmudelid

9:14

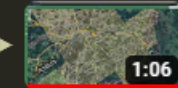
3D objektide tootmine ja detailsusastmed

14:2

Maa kaal

Maa-amet 3D

Maa-amet - 1 / 11



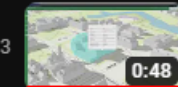
Maa-amet 3D - kõrgusmudel

Maa-amet



Maa-amet 3D - asulad

Maa-amet



Maa-amet 3D - hooned (1/2)

Maa-amet



Maa-amet 3D - hooned (2/2)

Maa-amet



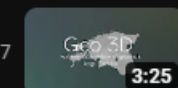
Maa-amet 3D - punktipilved

Maa-amet



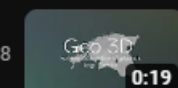
Maa-amet 3D - kaardirakendus

Maa-amet



Geo3D tutvustus

Maa-amet



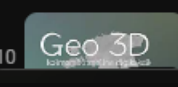
Geo3D teaser

Maa-amet



3D ruumiandmete tutvustus

Maa-amet



Meet Geo3D

Maa-amet



Meet Geo3D

Maa-amet
242 tellijat

Tellitud

6

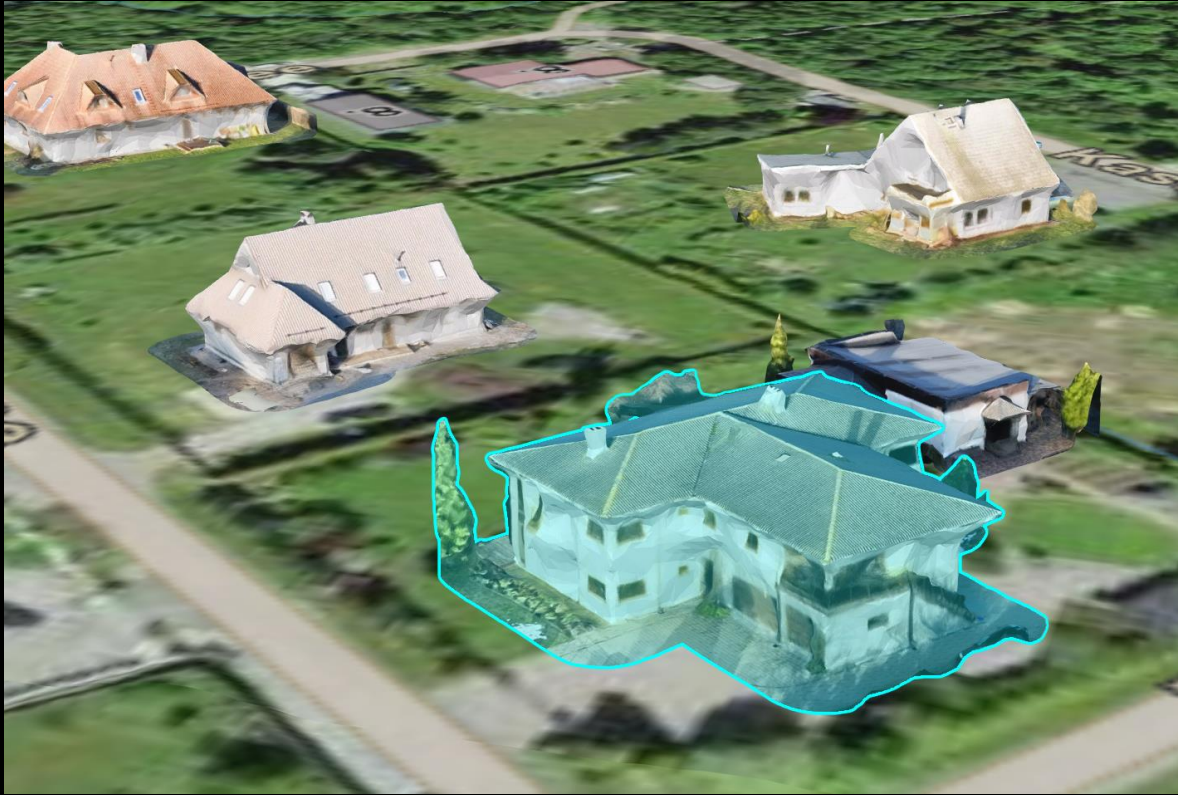
Jagamine

Offlaini

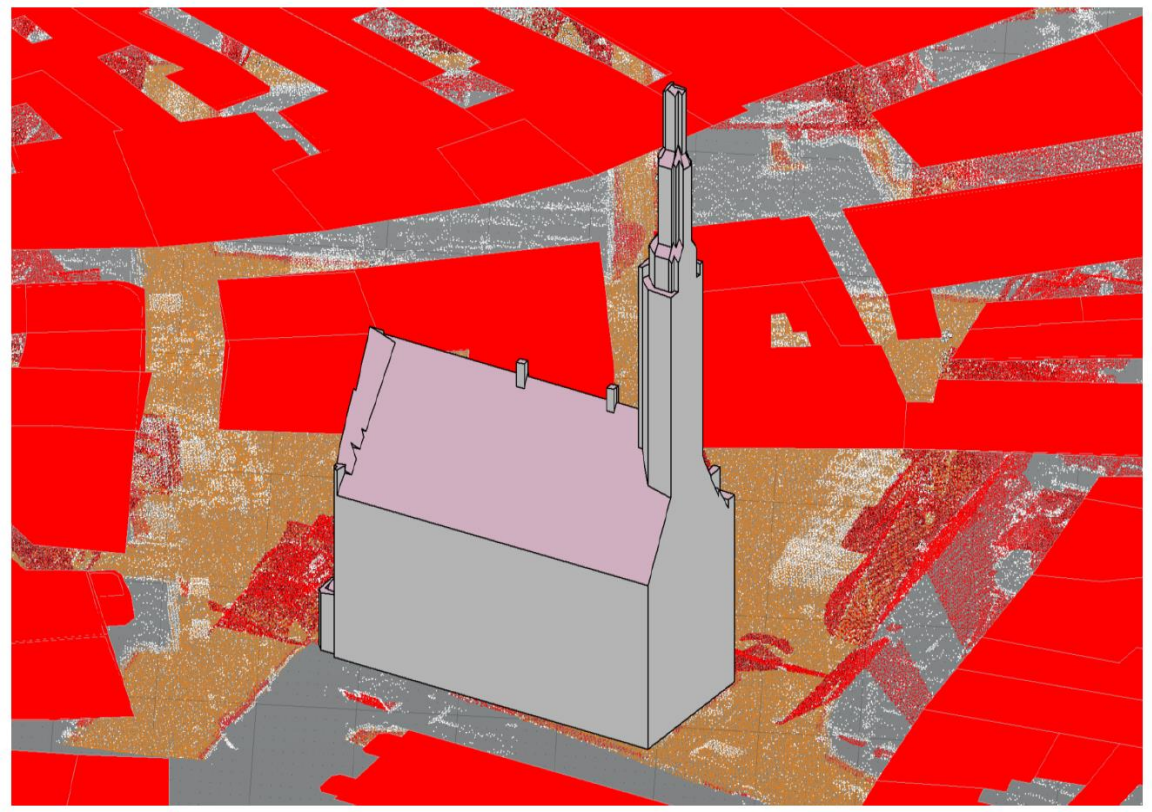
Klipp

Salvesta

future



Texturized buildings
(LOD2 + mesh)



Semi-automatically fix
important structures



40m

Harju Maakohus

Hoone kõrgus 39m
Ehitisregister | 20784231
Maakataster 78401:101:1103



80m

Lubja 2 ärihoone

Hoone kõrgus 30m
Ehitisregister | 20726937
Maakataster 78401:101:1103





REPUBLIC OF ESTONIA
LAND BOARD

Thank you!

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3d.maaamet.ee

