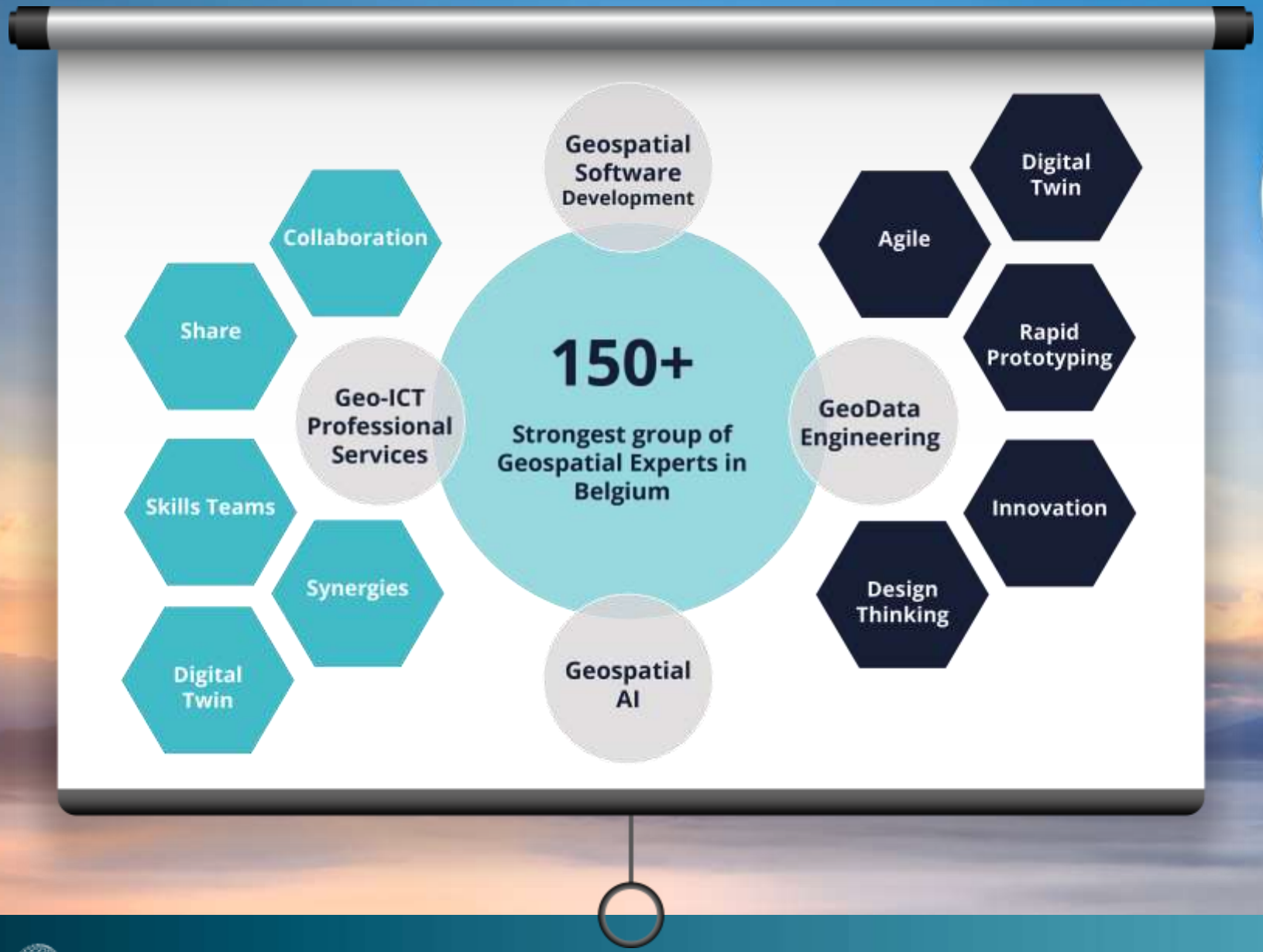
Geospatial AI’s potential for developing new data products

An Heirman

gim SMART GEO INSIGHTS

Smart Geo Insights

www.gim.be


Geospatial Software Development
Collaboration
Share
Geo-ICT Professional Services
Skills Teams
Synergies
Digital Twin
150+
Strongest group of Geospatial Experts in Belgium
Geospatial AI
Agile
Digital Twin
Rapid Prototyping
GeoData Engineering
Innovation
Design Thinking


gim
Merkator

GIM Labs
Today's data for tomorrow's reality

Our Vision
Enabling people to make smarter decisions and live better lives through 6D spatial data that model reality and predict the future

At home in various markets

Public

DATADRIVEN GOVERNMENT

SMART CITIES

Utilities

UTILITIES & INFRASTRUCTURE

Private

LOGISTICS

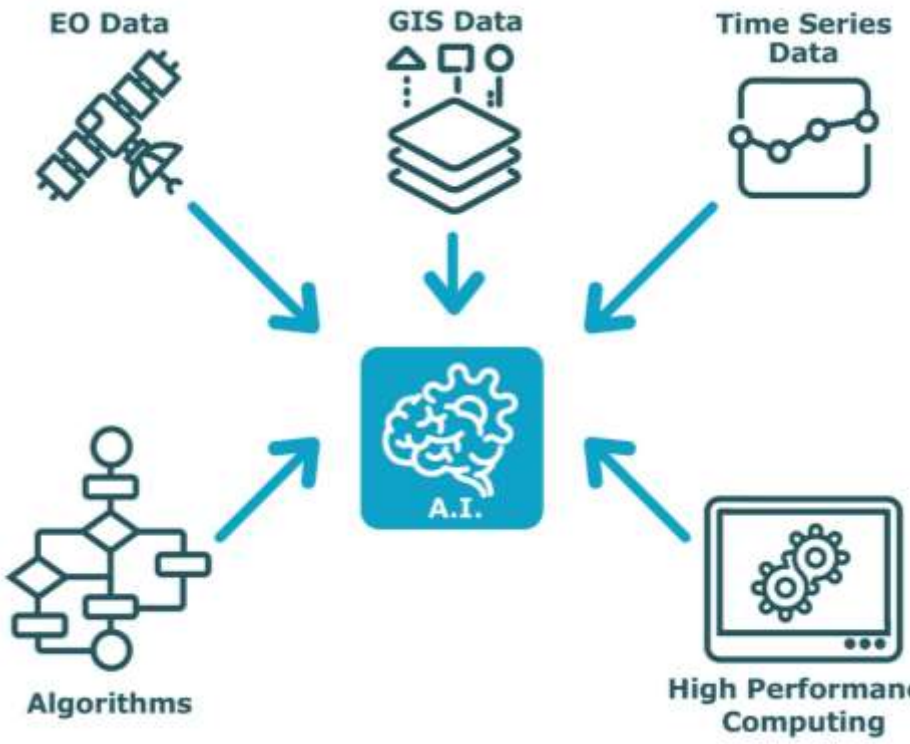
INSURANCE

CONSUMER PRODUCTS

RETAIL

What is Geo-AI?

A subset of AI that deals with geospatial datasets, where data possess spatial and/or temporal characteristics (typical: rasters, vectors, pointclouds,…) and helps solving spatial problems



Applications of GeoAI @ GIM

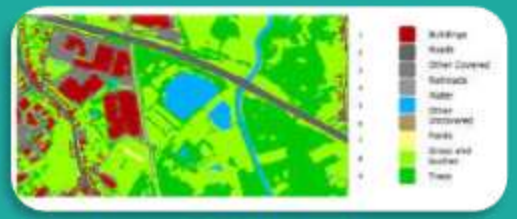
Building Properties

Belmap

Vegetation Asset Management

De Vlaamse Waterweg nv

ENGIE Laborelec



Infrastructure Asset Management

LE GOUVERNEMENT DU GRAND-DUCHÉ DE LUXEMBOURG
Administration du cadastre et de la topographie

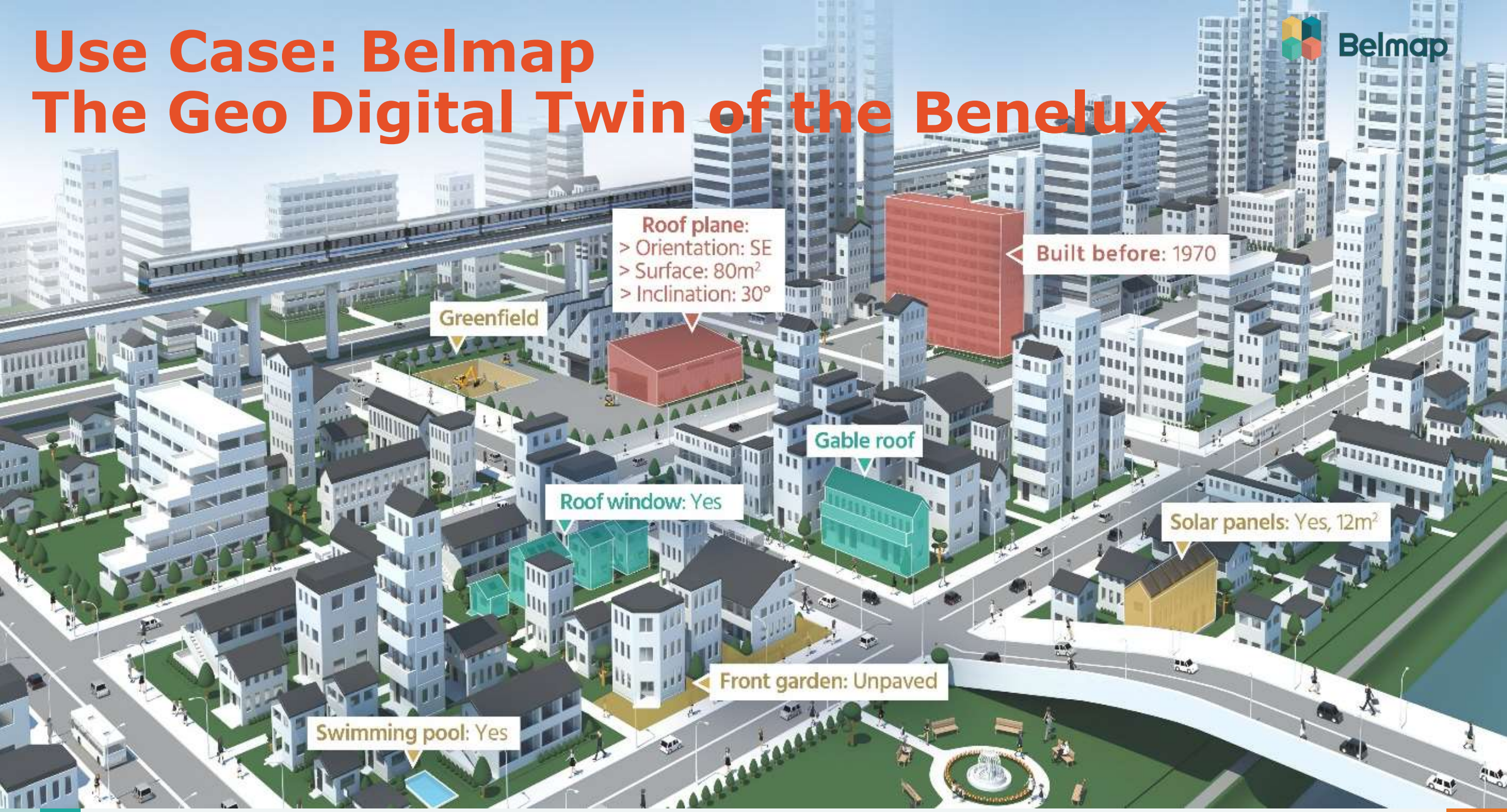
ENGIE Laborelec

SDG's

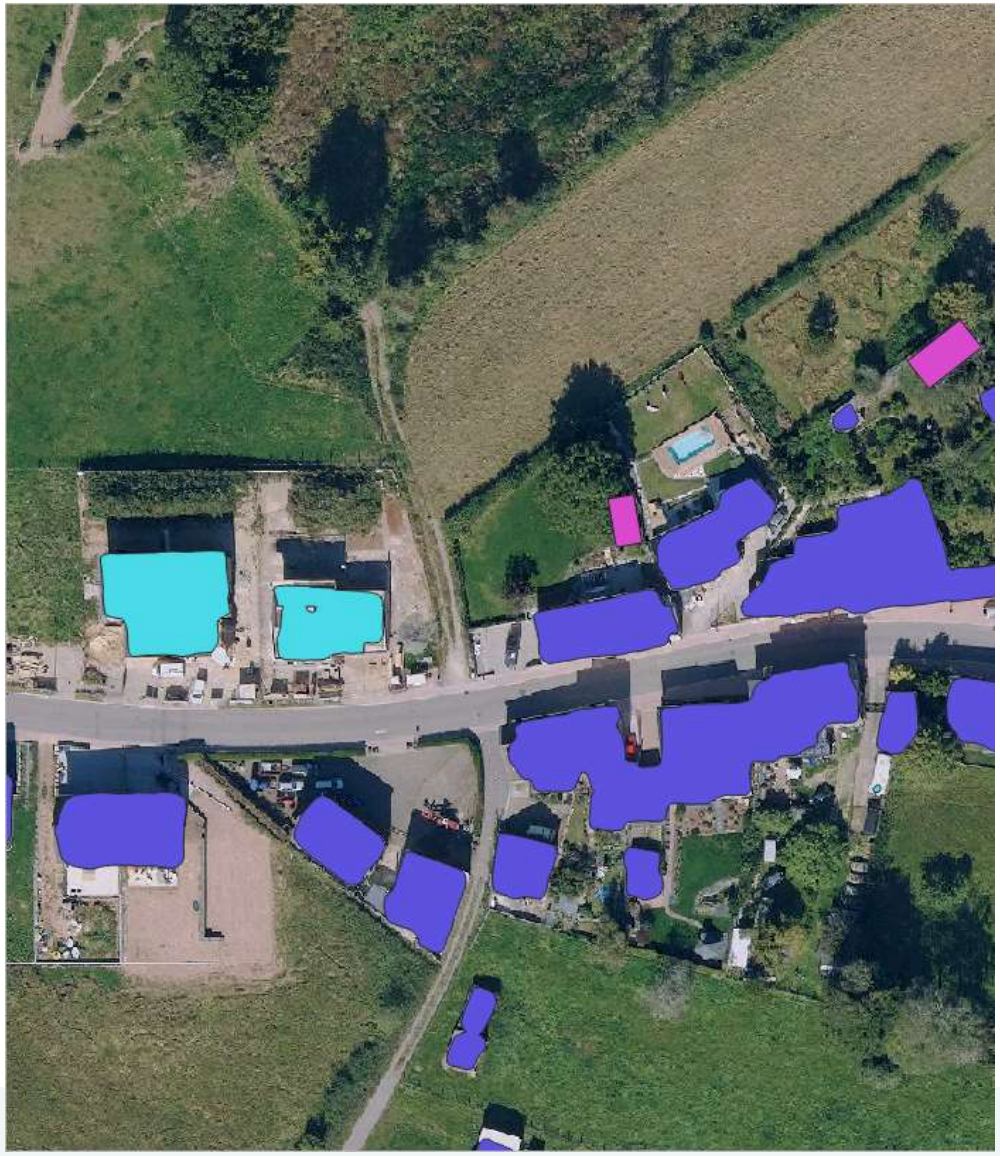
IDB Inter-American Development Bank

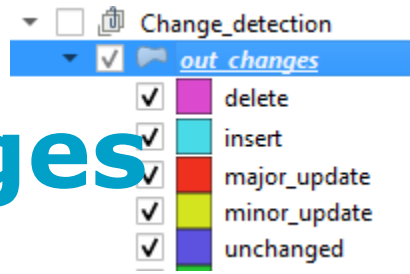
UNDP UNITED NATIONS DEVELOPMENT PROGRAMME

Use Case: Belmap
The Geo Digital Twin of the Benelux



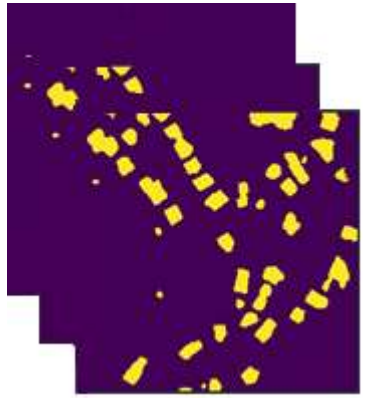
Belmap: Detecting building changes





Belmap Building Age

U-Net



Time series
NN

Belmap
Building Age

Belmap Roofs: LoD2 & Roof Characteristics

Reconstruction of buildings in LoD2

Roof orientation

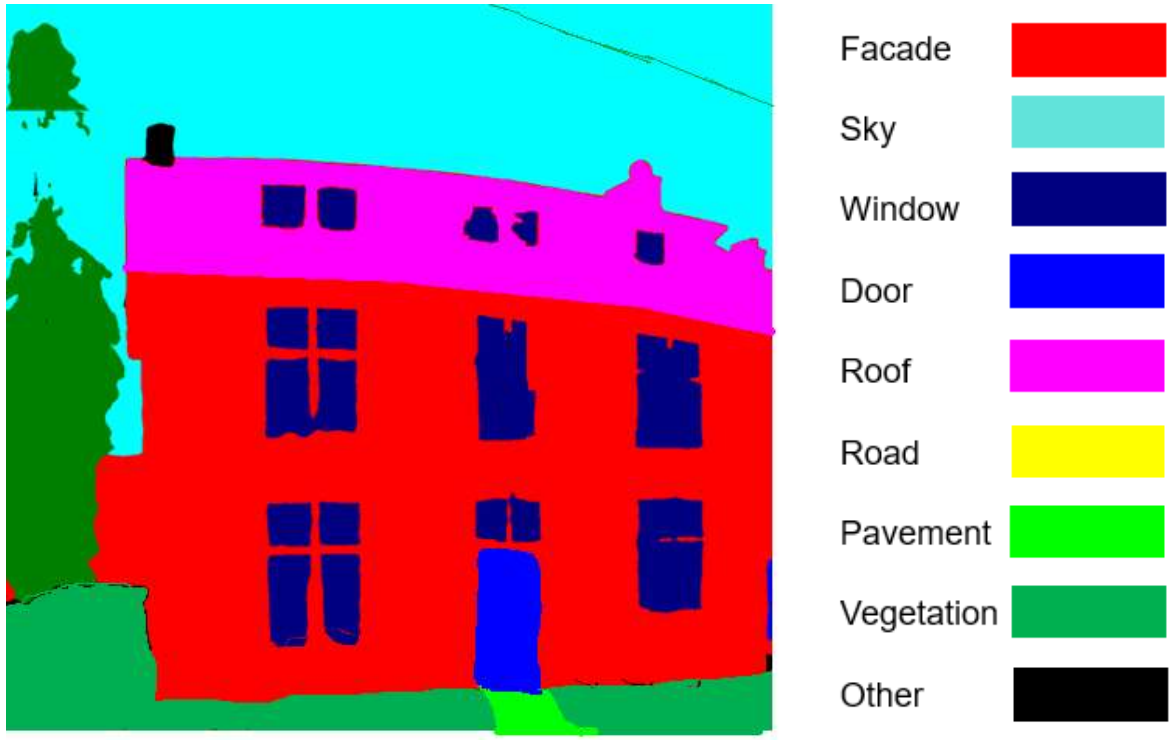
Belmap Roofs: Solar Panels & Roof Windows

Solar panels

Roof windows

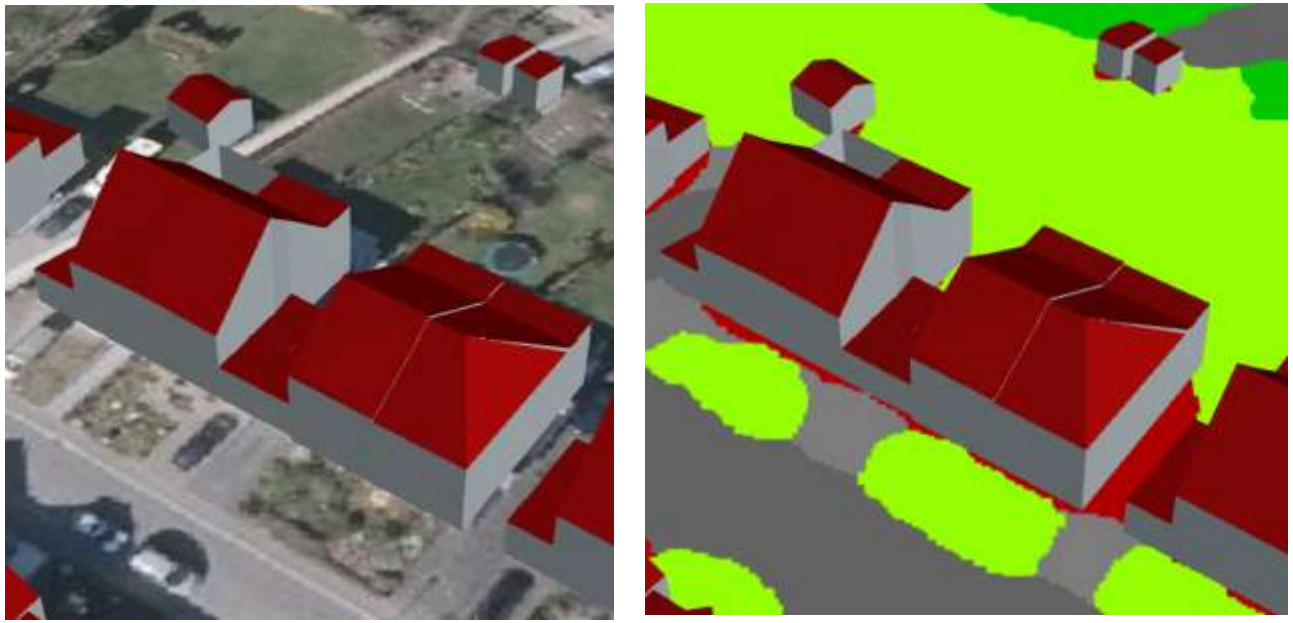
Façade schematization

Apply supervised DCNNs on façade imagery to determine the number of floors, windows, doors, sills, panels, road cover, …



Belmap Gardens: Swimming Pools & Land Cover

Swimming pools

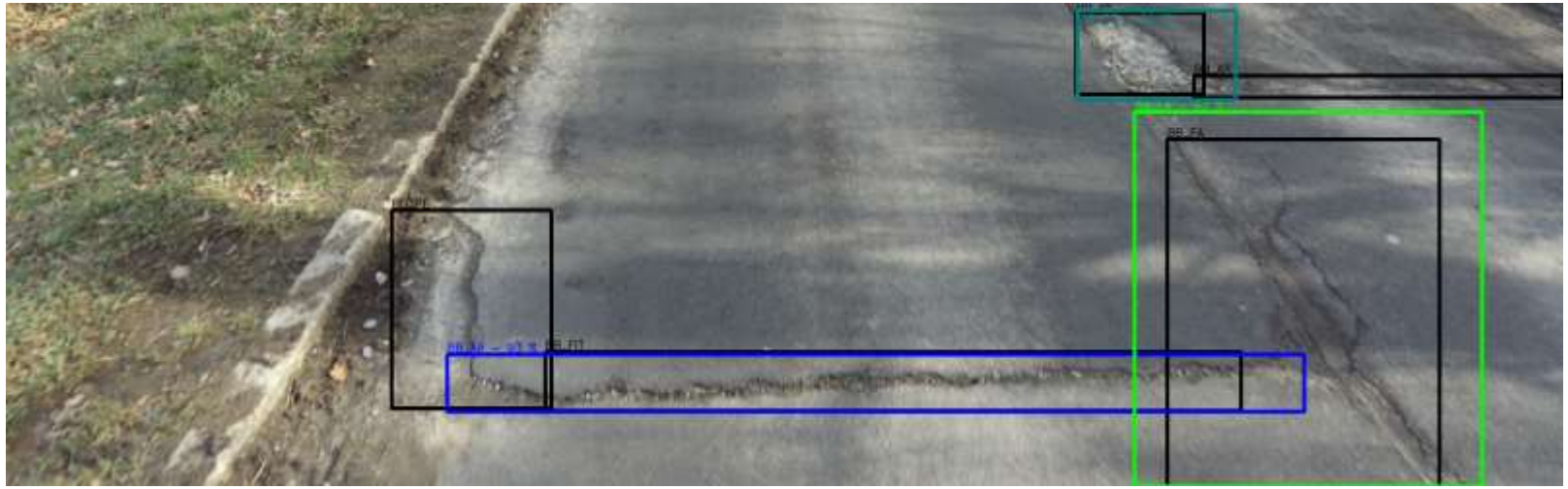


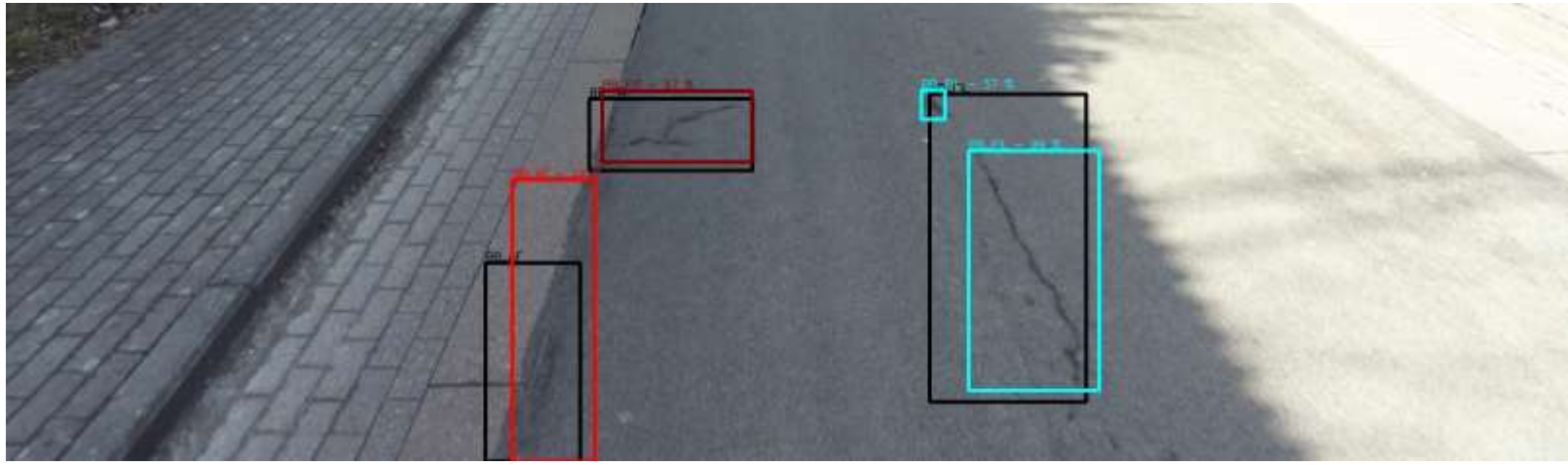
(Front) Garden land cover

Mapping Roadsides

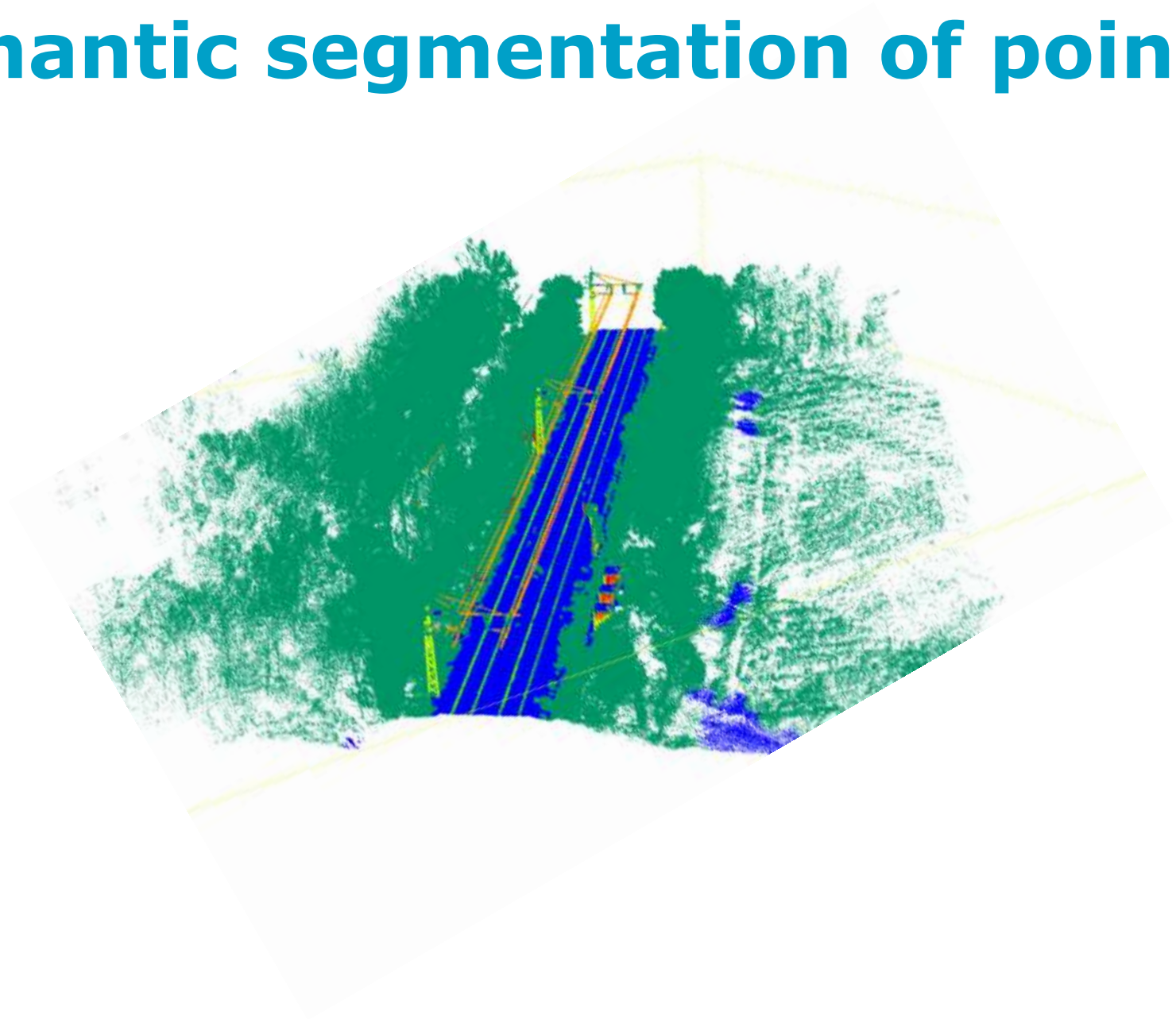
Capturing **pervious/impervious roadsides to estimate fiber roll-out trenching costs**

Road defect detection on Mobile Mapping Imagery





Semantic segmentation of point clouds



Semantic segmentation & structure from motion on consumer grade camera images

Superresolution on SEN-2 imagery

High Resolution Image

Low Resolution Image

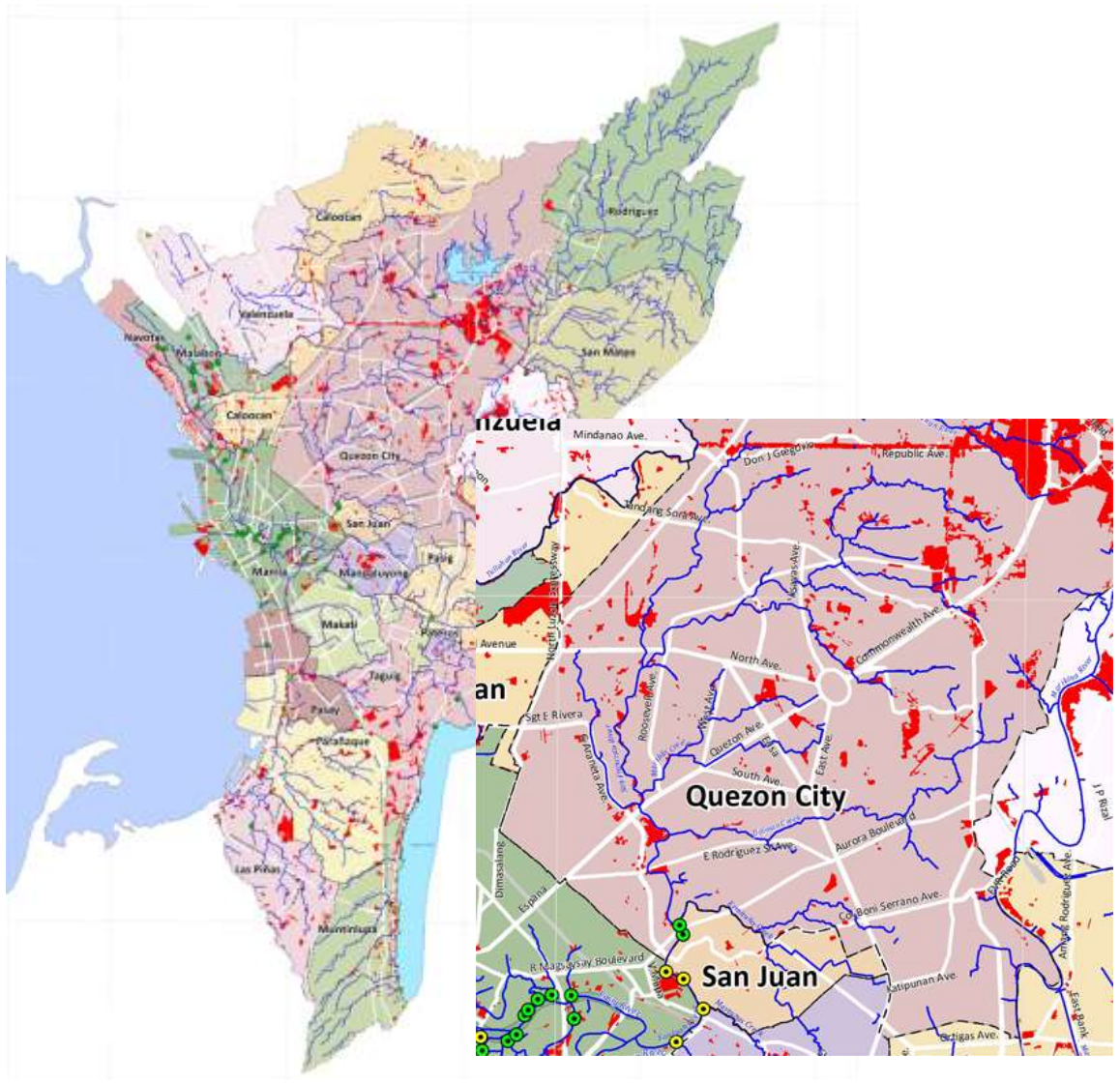
Super Resolved Image

Artificially enhance the resolution of imagery using a smart combination of generative adversarial networks and U-nets

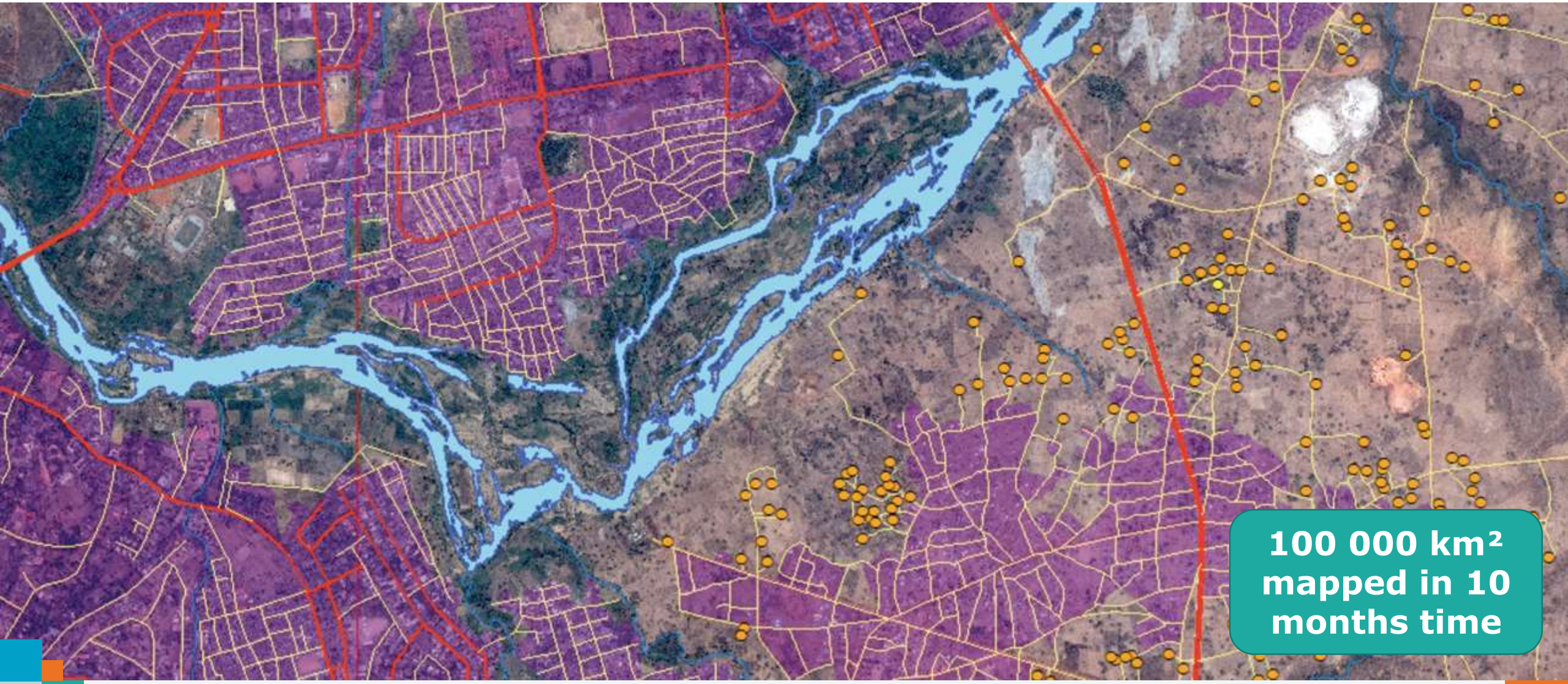
Informal Settlements & SDG's

Urban sprawl
Population density
Informal housing
Infrastructure needs
Exposure to Natural hazards
Waste management
Energy

(Informal) Settlements detection



Settlement Base Map to support polio vaccination campaigns



More Use Case: Utilities

Digitisation of old maps

Classification complexity
Semantic segmentation

Data quality control and cleaning

Anomaly detection/flagging

Predictive maintenance

Predicting chance of failure based on past failures and spatial context: underground, type and age of equipment, …

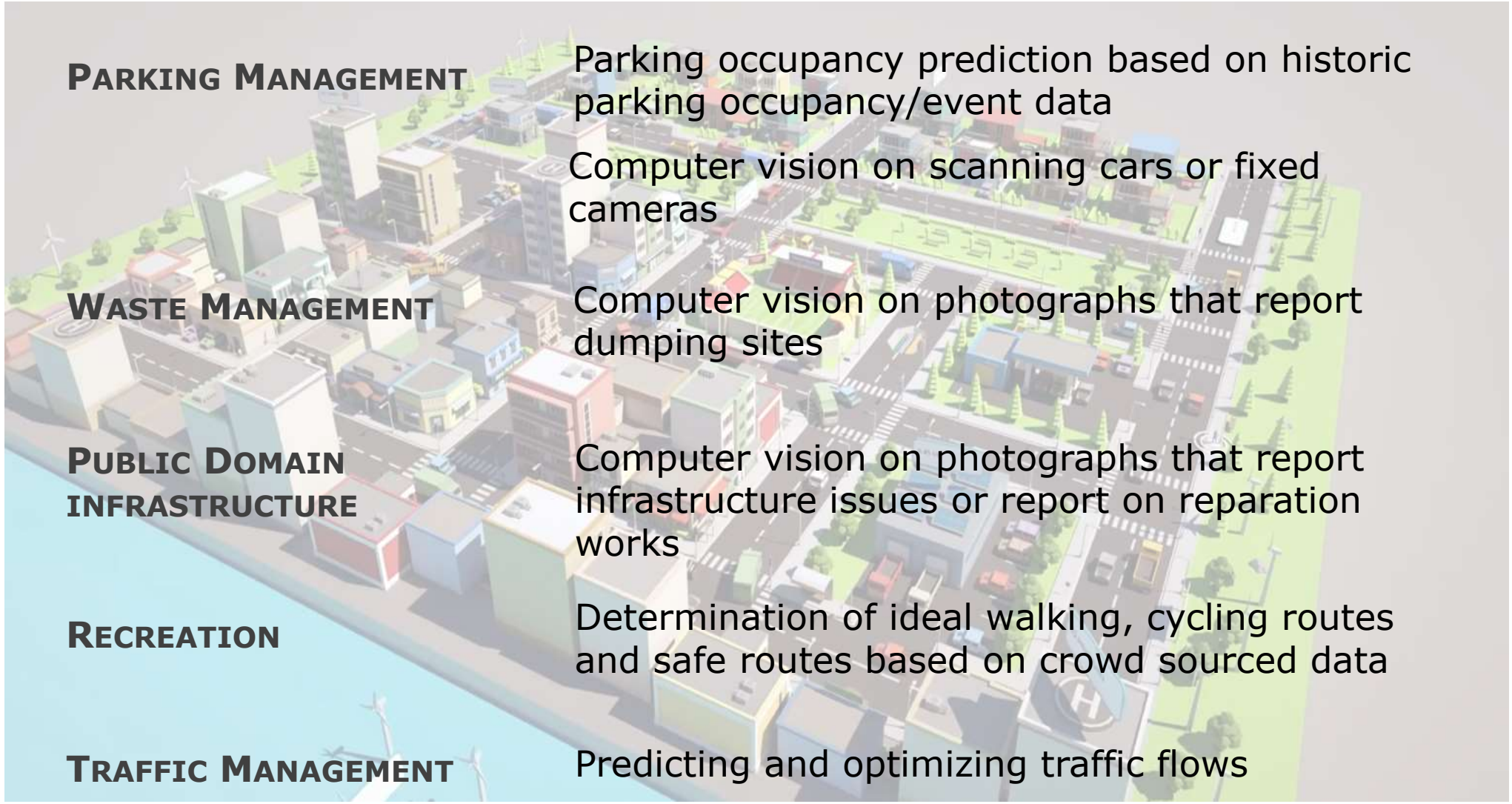
Automating repetitive tasks

Accept/Reject data modifications
Validate excavation/construction permits

Asset inventory

Classification of equipment types on photographs

More Use Cases – Local Government



Parking Management	Parking occupancy prediction based on historic parking occupancy/event data Computer vision on scanning cars or fixed cameras
Waste Management	Computer vision on photographs that report dumping sites
Public Domain Infrastructure	Computer vision on photographs that report infrastructure issues or report on reparation works
Recreation	Determination of ideal walking, cycling routes and safe routes based on crowd sourced data
Traffic Management	Predicting and optimizing traffic flows

Q&A
Thank you!

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