



# Bentley User Group Denmark, 2022 Geospatial Keynote

November 8<sup>th</sup>, 2022

**Bentley**<sup>®</sup>  
Advancing Infrastructure

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# Geospatial Keynote

1. Open cities Map
2. OpenCities Planner
3. Orbit & ContextCapture

Denmark user group, November 8<sup>th</sup>, 2022





# 1- OpenCities Map



Denmark user group, November 8<sup>th</sup>, 2022

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OpenCities Map is part of Bentley's ecosystem with products such as:

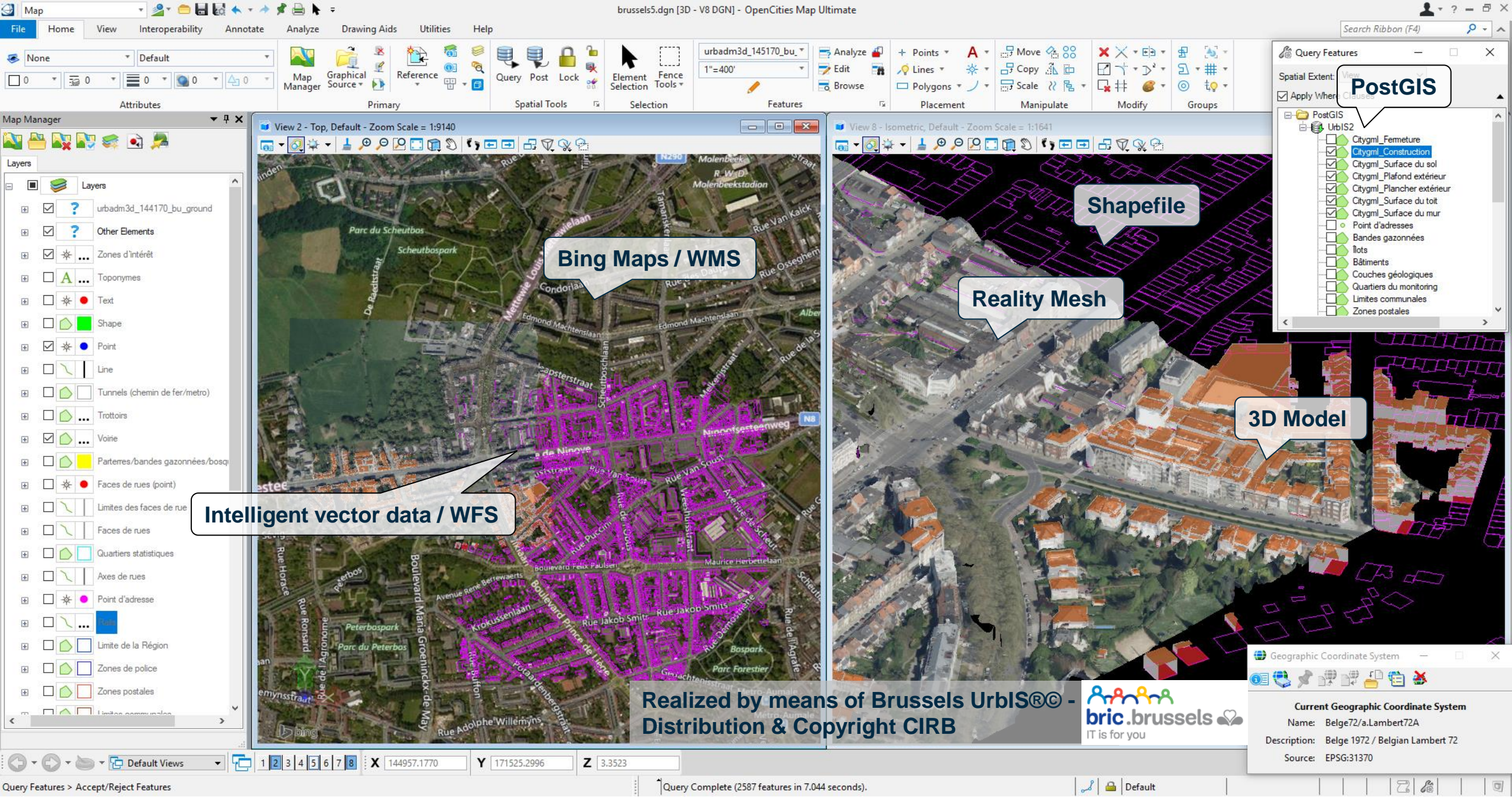
- **ContextCapture, Orbit** and **LumenRT** for rendering,
- **ProjectWise** for engineering document management
- **OpenCities Planner** for sharing.

OpenCities Map helps cities and infrastructure operators in their digital transformation to bring together digital infrastructure assets and context data.



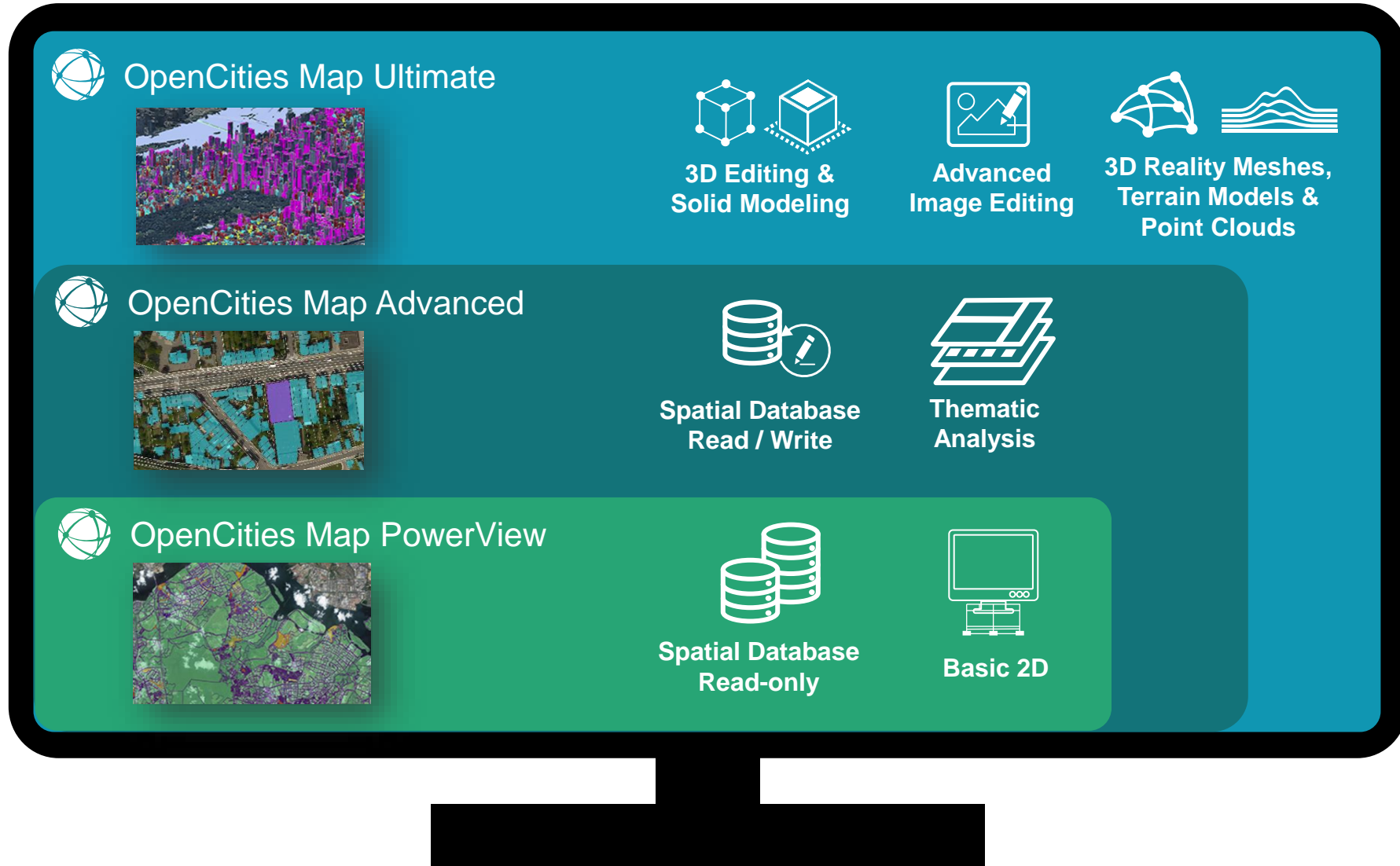
Industry Solutions advancement unit  
iTwin Context Portfolio







# Which OpenCities Map Application to Use?



# OpenCities Map | Bentley's iTwin Context Portfolio



**OpenCities Map**  
CONNECT Edition

## PowerView

- Spatial Database Read Only
- Basic 2D
- Run Map API developed applications

Provides 2D design capabilities for creating and maintaining engineering-quality spatial data.

## Advanced

- Spatial Database Read / Write
- Thematic and Spatial Analysis
- Create custom applications using Map API
- SDK to develop the API

Enrich CAD-based mapping workflows by expanding MicroStation's capabilities with feature-based modeling and support for seamless data persistence in spatial databases.

## Ultimate

- 3D Editing & solid modeling
- Reality data Editing
- Create custom applications using Map API

Provides you with efficient 3D modeling capabilities for documenting and modeling assets in a geospatial environment.

## API

- An extension of MicroStation API
- VBA, C, C++, .NET

Provides subject matter experts an API to create their own custom GIS application to meet their unique needs.



## 2- OpenCities Planner

Denmark user group, November 8<sup>th</sup>, 2022





**Access** Critical Infrastructure Data



**Collaborate** with Key Stakeholders



**Automate** Processes and Workflows

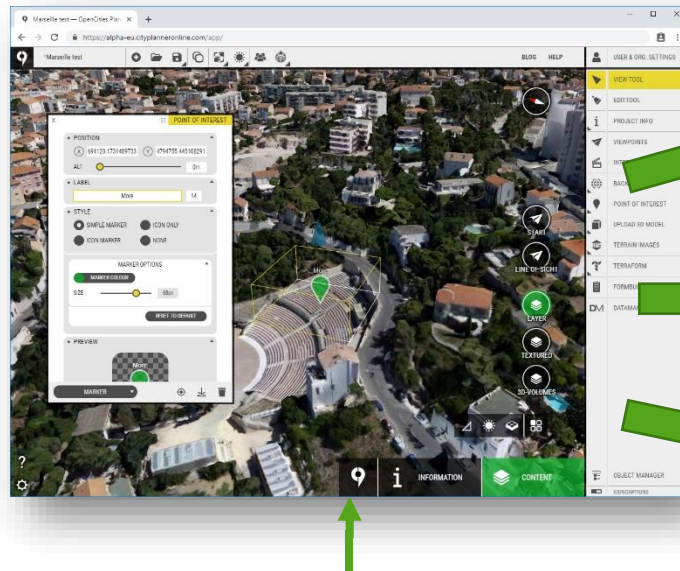


**Make Data-Driven** Decisions

# CITY SCALE DIGITAL TWIN



## Project Editor



## Project content

- Spatial DB, Reality Models, 3DCityDB
- WMS, Geo Images, Shape
- 3D CAD models
- Points of interest
- Questionnaire form
- Editor Tools: Sketching, Shadows, Videos



## Team, Stakeholders, Citizens

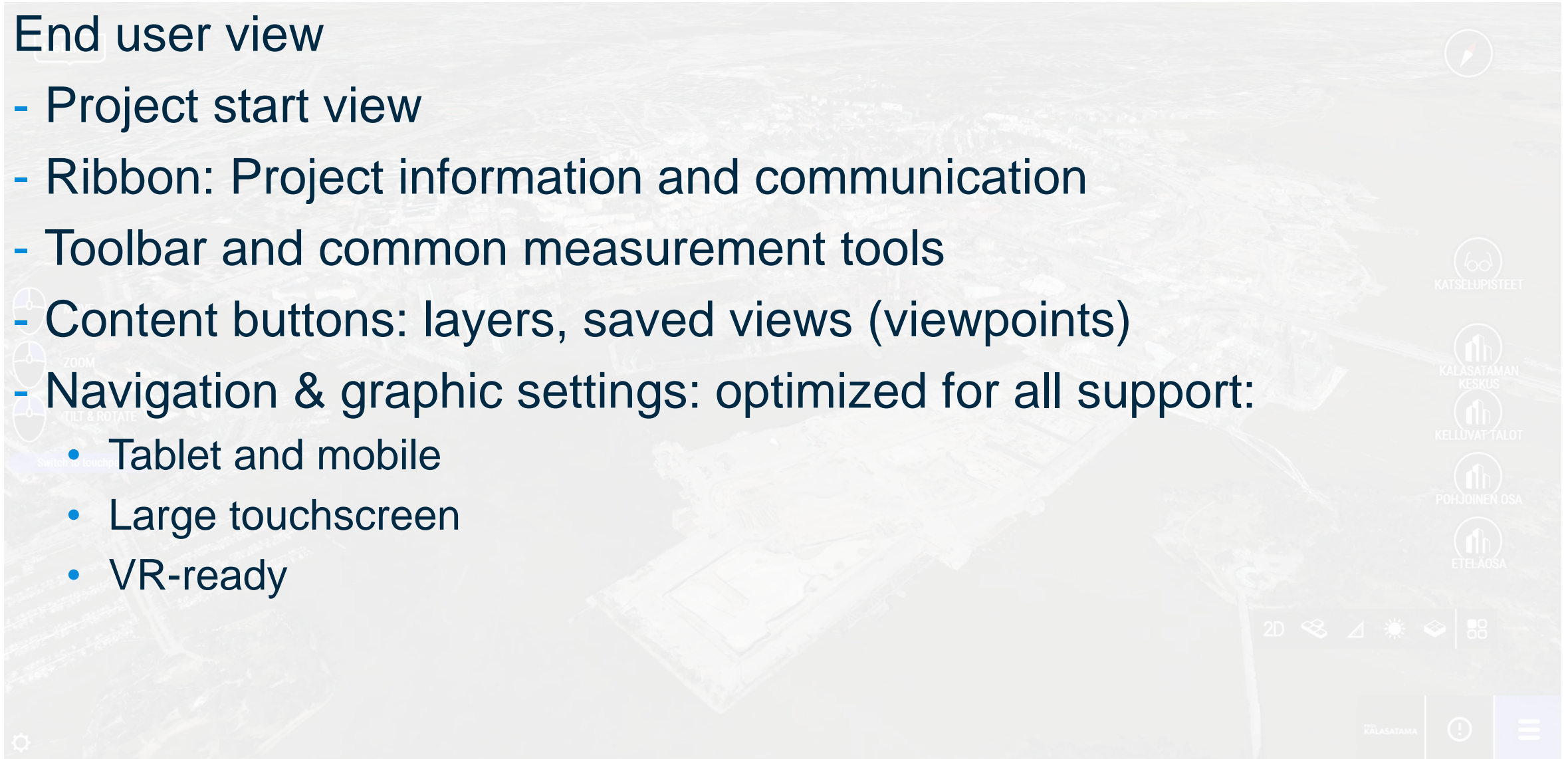




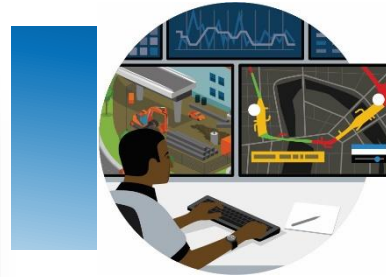
# OpenCities Planner: Project view

## End user view

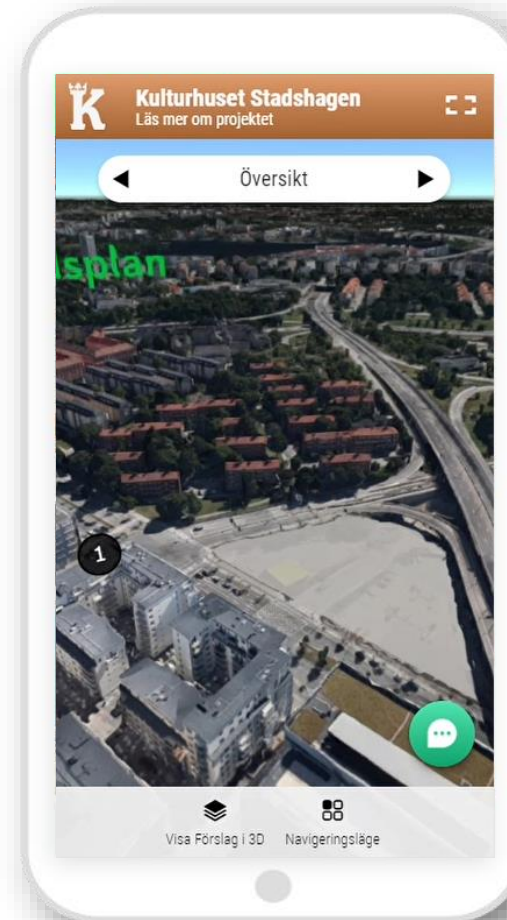
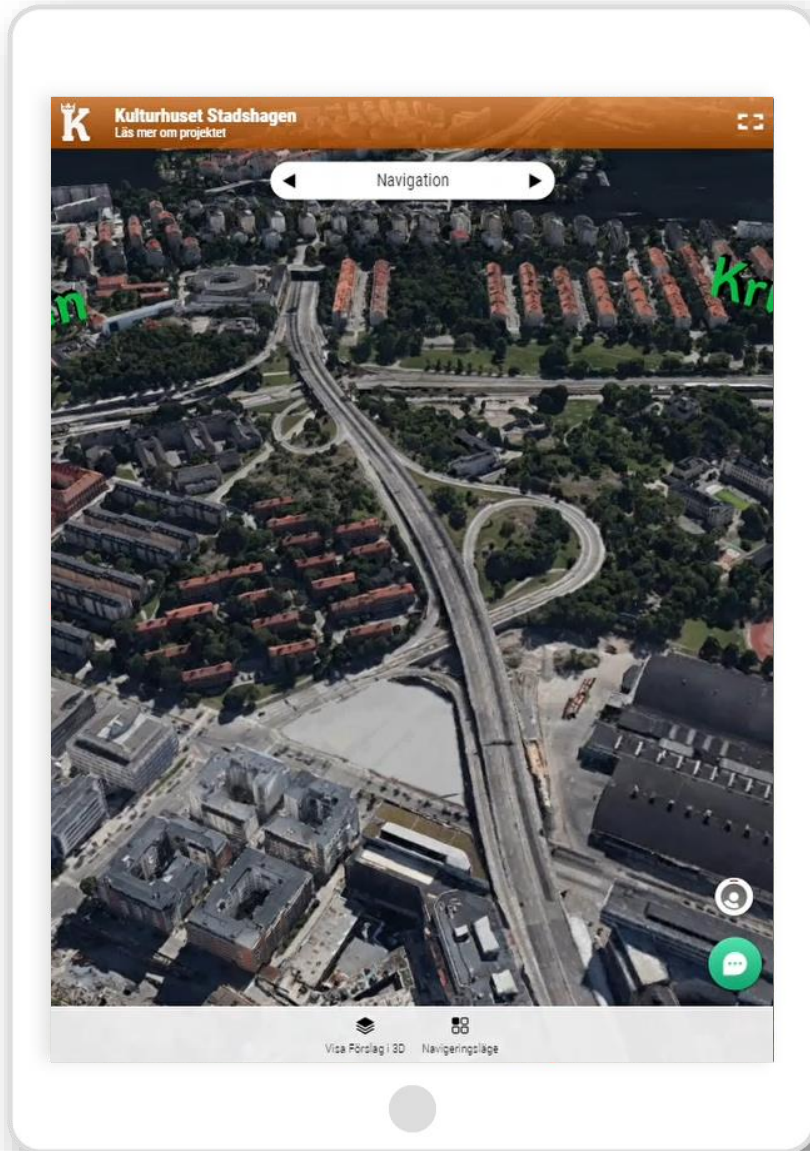
- Project start view
- Ribbon: Project information and communication
- Toolbar and common measurement tools
- Content buttons: layers, saved views (viewpoints)
- Navigation & graphic settings: optimized for all support:
  - Tablet and mobile
  - Large touchscreen
  - VR-ready







# MOBILE FIRST





# OpenCities Planner

## Update: Multi project starting view



Välkommen till Min Stad! Ett klotterplank där du kan skapa inlägg på höjden och bredden utifrån dina drömmar, behov och intressen. Vi välkomnar en livlig och öppen debatt.



Göteborg berättar



Inlägg från medborgare



Stadsutveckling



Göteborg 400 år

Majorna-Linné



# OpenCities Planner

Update: More reality data connected

- Ortho / DSM: Geotiff, jpg and WMS/WCS or Bing Maps link
- Reality Model: **ContextShare connection: 3D tiles and w3sm**
- Point cloud: **ContextShare connection: OPC**
- CAD / BIM design data: **imodel connection**
- Vector building features:
  - KMZ or DAE (Collada) files
  - WFS
  - ESRI FeatureService
  - GeoJSON
  - CityGML via 3DCityDB



# OpenCities Planner: Goteborg project



Välkommen till Min Stad! Ett klotterplank där du kan skapa inlägg på höjden och bredden utifrån dina drömmar, behov och intressen. Vi välkomnar en livlig och öppen debatt.



Göteborg berättar



Inlägg från medborgare



Stadsutveckling







## Toronto TTC

Gateway to all ongoing projects



Project Status



Toronto Citizen engagement



Project Data



TTC Portal



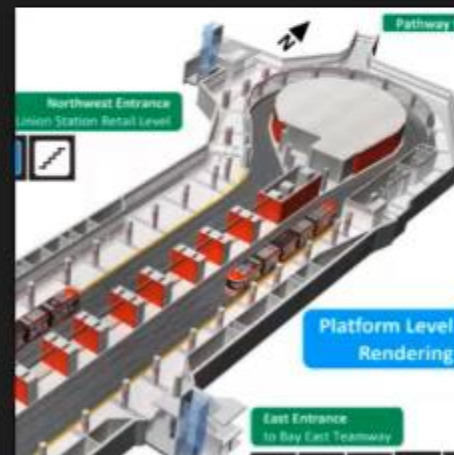
Toronto TTC  
Gateway to all ongoing projects



Project Status



Toronto Citizen engagement



Project Data



TTC Portal



# 3- Orbit and ContextCapture



Denmark user group, November 8<sup>th</sup>, 2022

**Bentley**<sup>®</sup>  
Advancing Infrastructure



# Orbit solutions

From mapping to digital twin:

- Single Source of Truth
- Bridge the physical and virtual
- Span entire asset lifecycle
- Update continuously
- A way to visualize assets, check status, perform analysis and generate insights

Essential part of the *Digital Twin* is the way to create, manage and use your **Digital Context**





## Today's **Digital Context** has a strong Mobile Mapping focus:

- Mobile mapping is the process of collecting geospatial data from a mobile vehicle, person, plane, ...
- Walking – Driving – Flying
- Aerial – Indoor – Outdoor - Underground
- Use of multiple sensors (LiDAR & Imagery)
- Continuous and fast data capturing





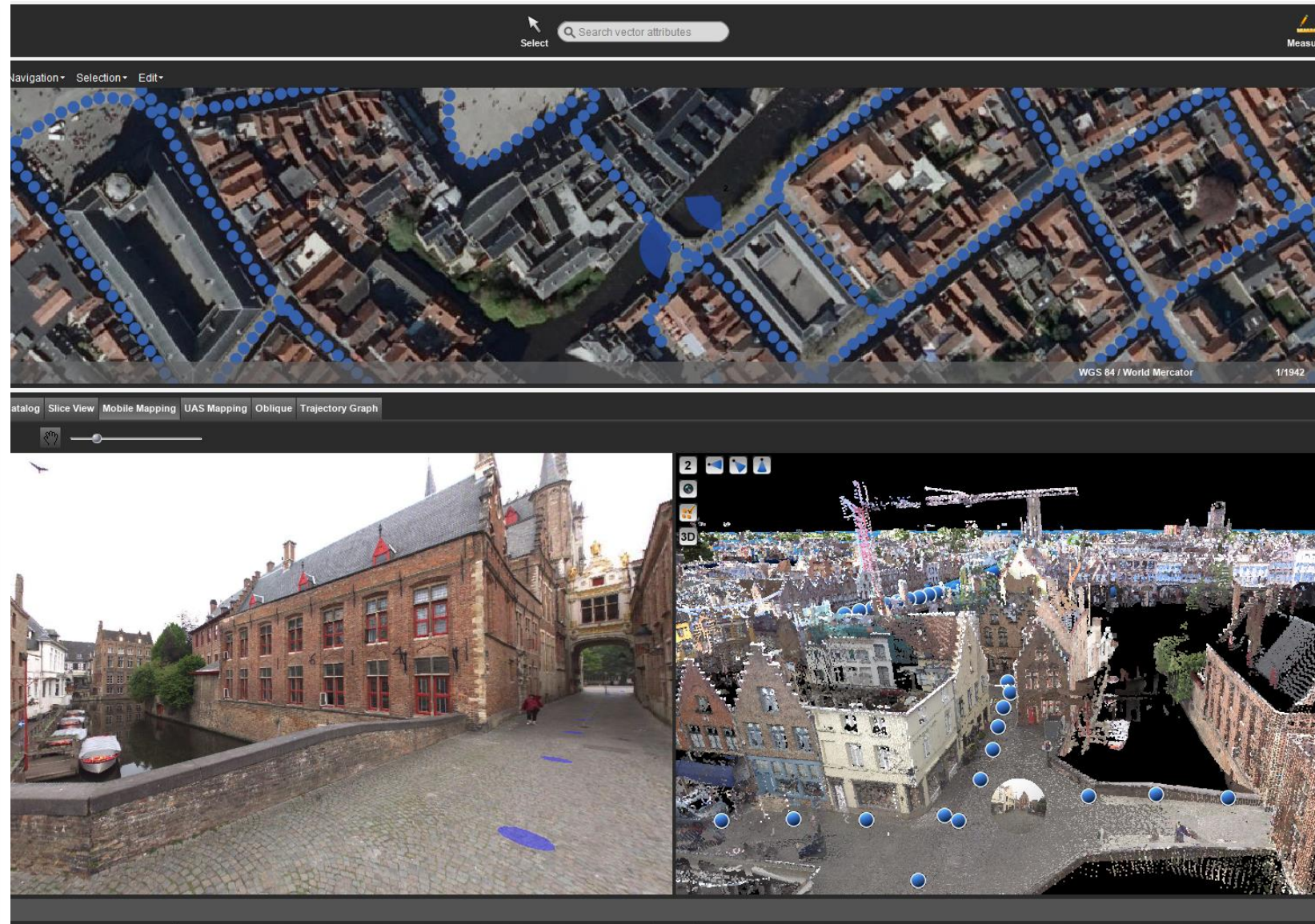
# Orbit supports all Mobile Mapping data

After processing, import of:

- LiDAR/DSM colorized point clouds
- Spherical and/or Planars (Oblique, Nadir, ...) Imagery
- Trajectory, Time related recording
- Derived products: meshes, orthophoto, ...

-----> Complex data, need for single resource  
1 collection = 1 run = 1 single resource

Hundreds of different systems exist. Importance of a strong industry support

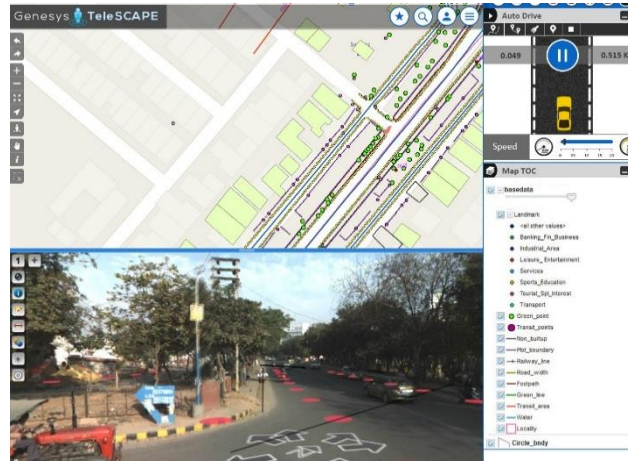




# Orbit supports Mobile Mapping for :

- Telco & Utilities
- Road & Rail Transportation
- Smart Cities & Gov
- Construction & Surveying
- Asset Inventory
- ...
- Building the Digital Twin

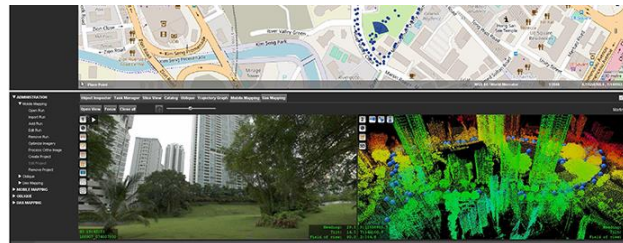
## STREAMLINING THE WORKFLOW OF TELECOMMUNICATIONS IN INDIA



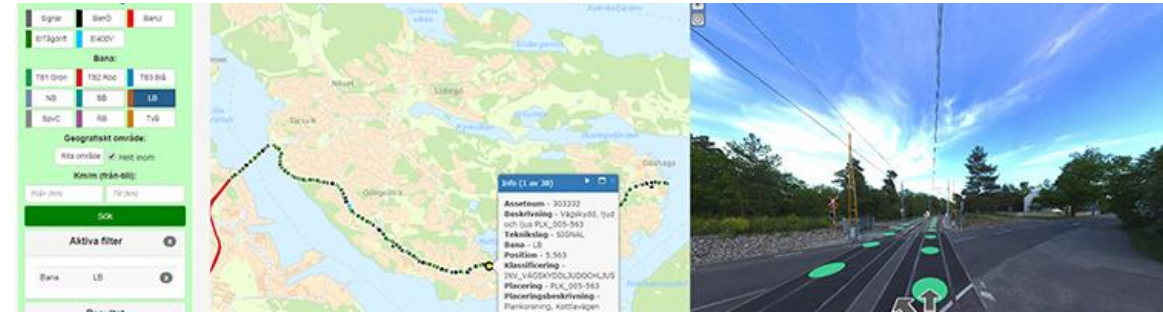
## MANAGING STREET-SIDE TREES IN SOUTH KOREA



## SINGAPORE SMART NATION & AUTONOMOUS VEHICLE MAPS IN SINGAPORE



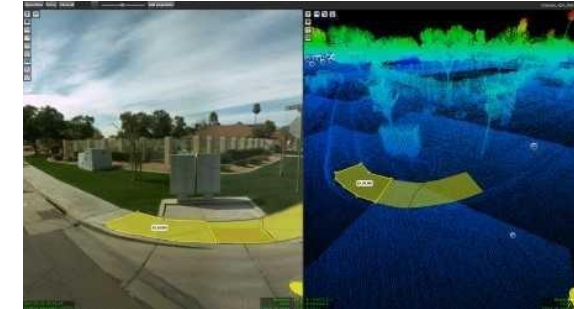
## STOCKHOLM PUBLIC TRANSPORT: ADMINISTRATION RAIL ASSET MANAGEMENT



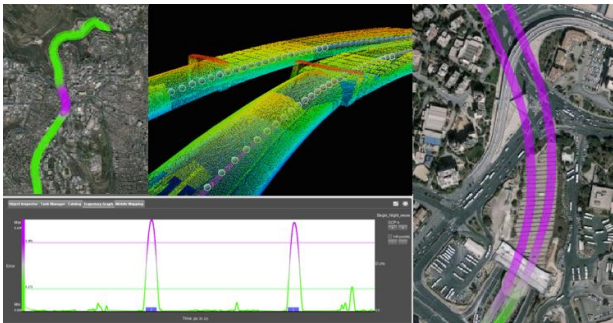
## THE ISLE OF MAN: TT RACE MOBILE MAPPED FOR HIGHWAY ASSET MANAGEMENT AND GAMING



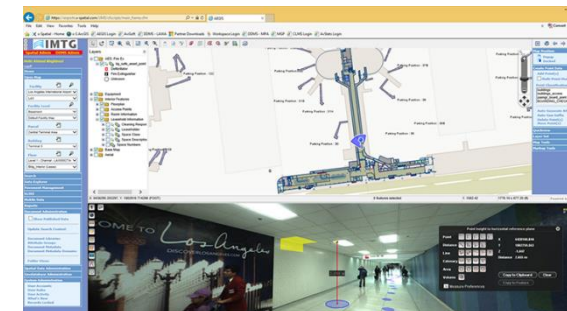
## OPTIMIZED PROCEDURES FOR SLOPE INVENTORY IN PHOENIX, ARIZONA



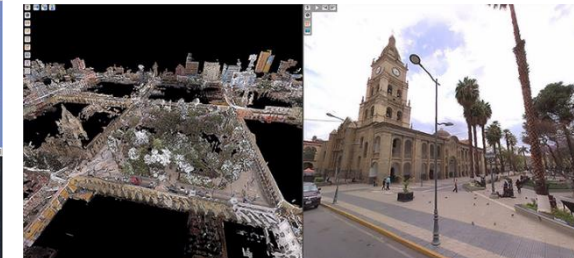
## MOBILE MAPPING TUNNELS IN ISRAEL



## INDOOR MAPPING AT LOS ANGELES AIRPORT



## MOBILE MAPPING TO IMPROVE WATER UTILITY SERVICES IN BOLIVIA





## CAPTURE

**Contractors** collect data  
Data is **processed** to acquire:

- proper positioning
- real world coordinates

Result sets are **output** in Standard Formats (LAS, JPG) and a set of specific descriptions (EO, Time, Trajectory, ...)

**Orbit Templates** match these outputs to enable import



## MANAGE



Data Management  
data acquisition experts

## ANALYZE



## SHARE



## Capture, Manage, Analyze, Share

Hardware specific software  
Processing software



- Riegl Riprocess, Riegl Ricapture, Leica AutoP., Trimble Business Center, Optech LMS, ...
- Vexcel Ultramap, Trimble Inpho, ...
- **ContextCapture**, Agisoft, ...





How do you manage multiple resources, different capturing systems, ... in one project?

- The digital context comes from drones, mobile mapping, aerial oblique mapping, reality meshes, models, GIS resources, ...
- How to manage indoor/outdoor/underground data
- Data needs to be aligned on time and brought together in one single Digital Context.





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## MANAGE



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data acquisition experts

## MODEL



## SHARE



### MANAGE DATA first with **Orbit 3DM Content Manager**

Stand-Alone desktop software  
for data acquisition experts

### MAIN GOALS:

- COMBINE DATA
- QA-QC, DATA OPTIMIZATION
- READY FOR FEATURE EXTRACTION
- UPLOAD TO THE CLOUD



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## ANALYZE



## SHARE



### MANAGE DATA first with **Orbit 3DM Content Manager**

Stand-Alone desktop software  
for data acquisition experts

- IMPORT / OPTIMISE / THIN 3D MAPPING DATA
- CATALOG / EXPLORE / ARCHIVE
- VERIFY / QC ADJUST POSITIONAL ACCURACY
- CLEAN & OPTIMISE POINT CLOUD
- MERGE RUNS & SEGMENTS
- CONSOLIDATE & DELIVER PROJECTS
- PROCESS FOR STREAMING AND UPLOAD TO SHARE





## How do we optimize our 3D Mapping?

- Extraction based on images and point cloud
- Extract fast, less clicks, automated.
- Extract in your GIS/CAD, according the required standards
- Extract on the entire project
- Perform road/rail analyses
- ....





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## SHARE



### ANALYZE DATA with **Orbit 3DM Feature Extraction**

Stand-Alone desktop software  
Client-Server software  
for data analysis technicians

- MEASURE - MODEL - COPY – DOCUMENT
- EXTRACT ACTIONABLE DATA
- MANUAL - SEMI - FULL AUTOMATED DETECTION
- ASSET INVENTORY WORKFLOWS
- FLOOR PLAN - VOLUMES - PROFILES - CONTOURS
- CROSS SECTIONS - SLOPE MEASUREMENTS
- BRIDGE CLEARANCE - CLASH DETECTION
- PRODUCTION TEAM SETUP
- TEMPLATE BASED DETECTION
- DELIVER FOR CAD/GIS

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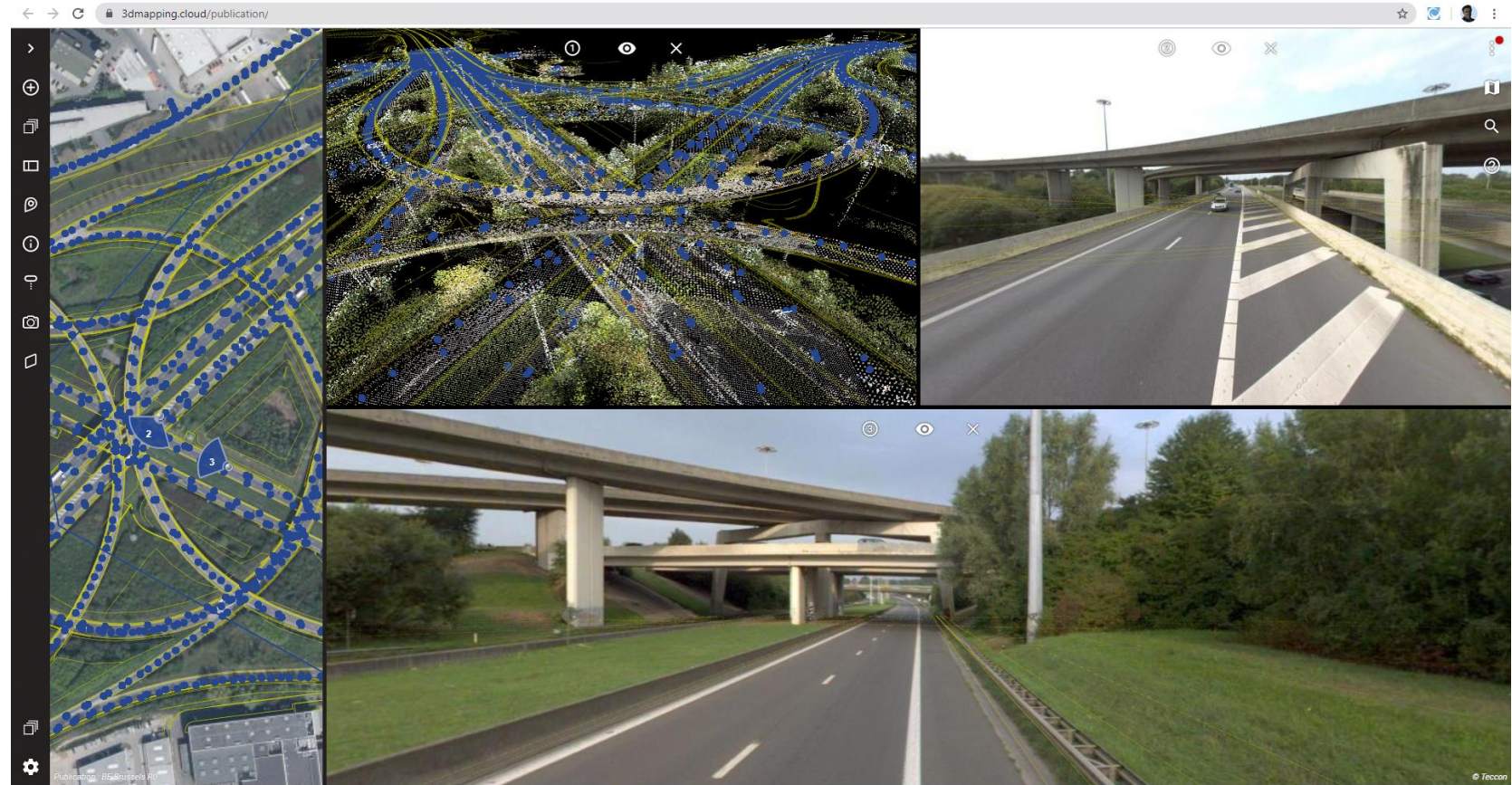
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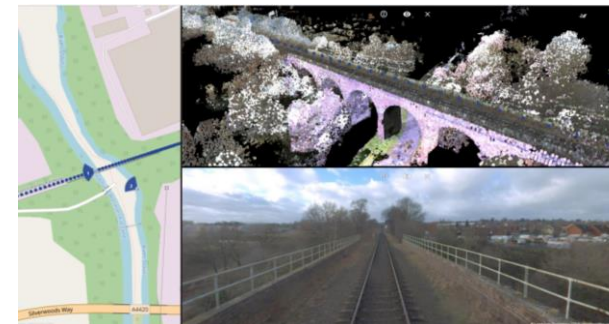
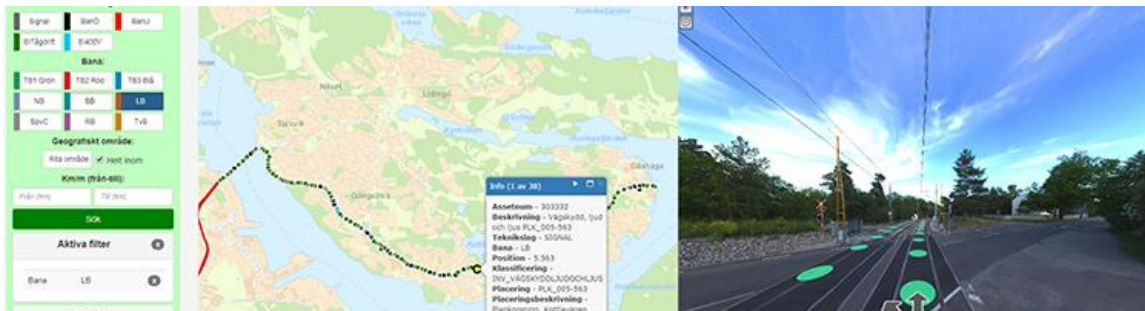


# How to bring the Digital Context in your workflow?

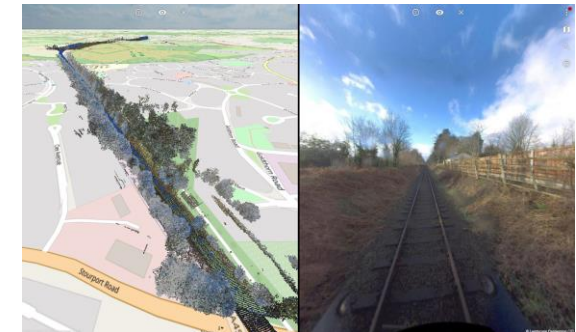
- Webbrowser
  - Desktop & mobile devices
- Plugins in 3<sup>rd</sup> party software:
  - Esri, Autodesk, Microstation, QGIS, ...
  - API/SDK



## STOCKHOLM PUBLIC TRANSPORT: ADMINISTRATION RAIL ASSET MANAGEMENT



UK BEWDLEY RAILWAY PROJECT



UK KIDDERMINSTER RAILWAY PROJECT

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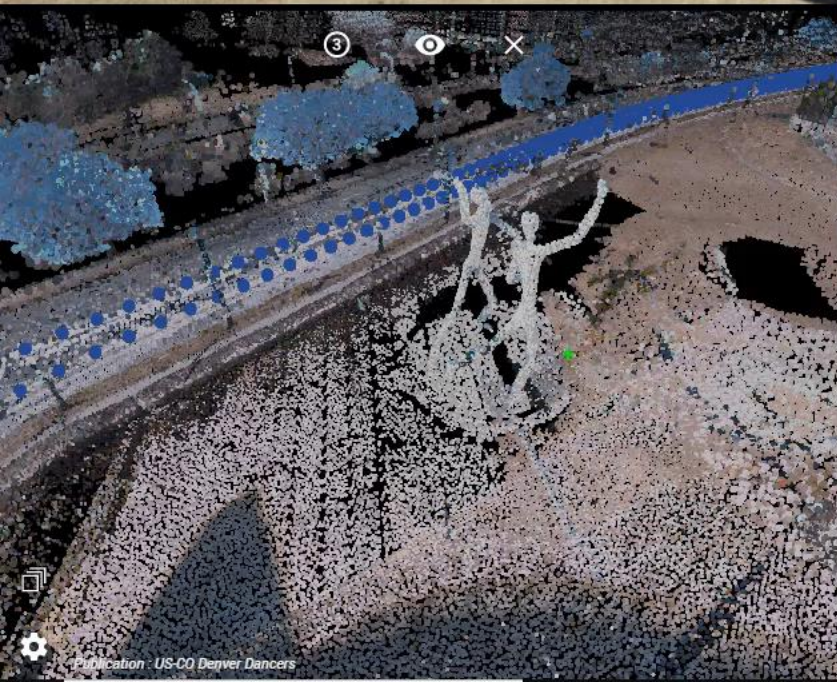
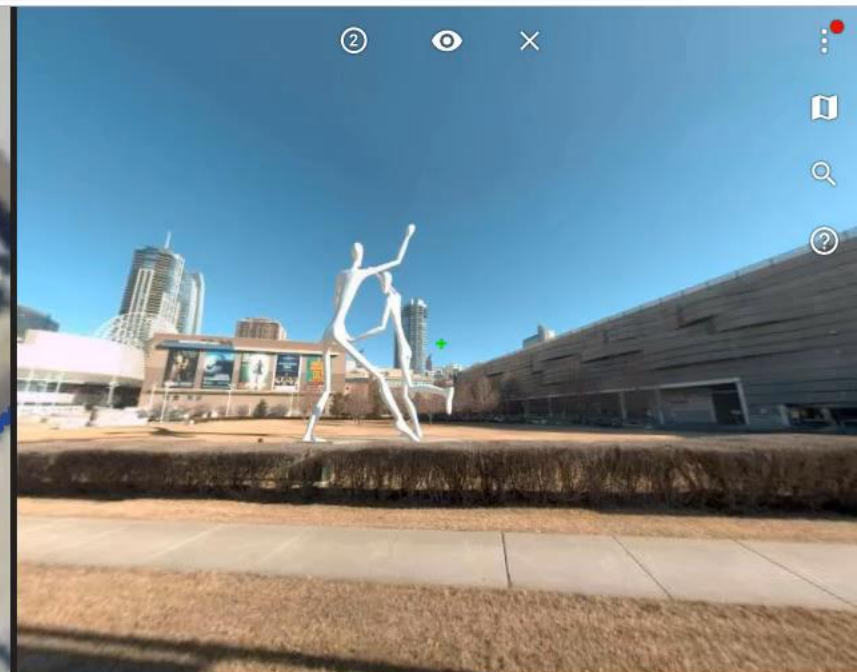
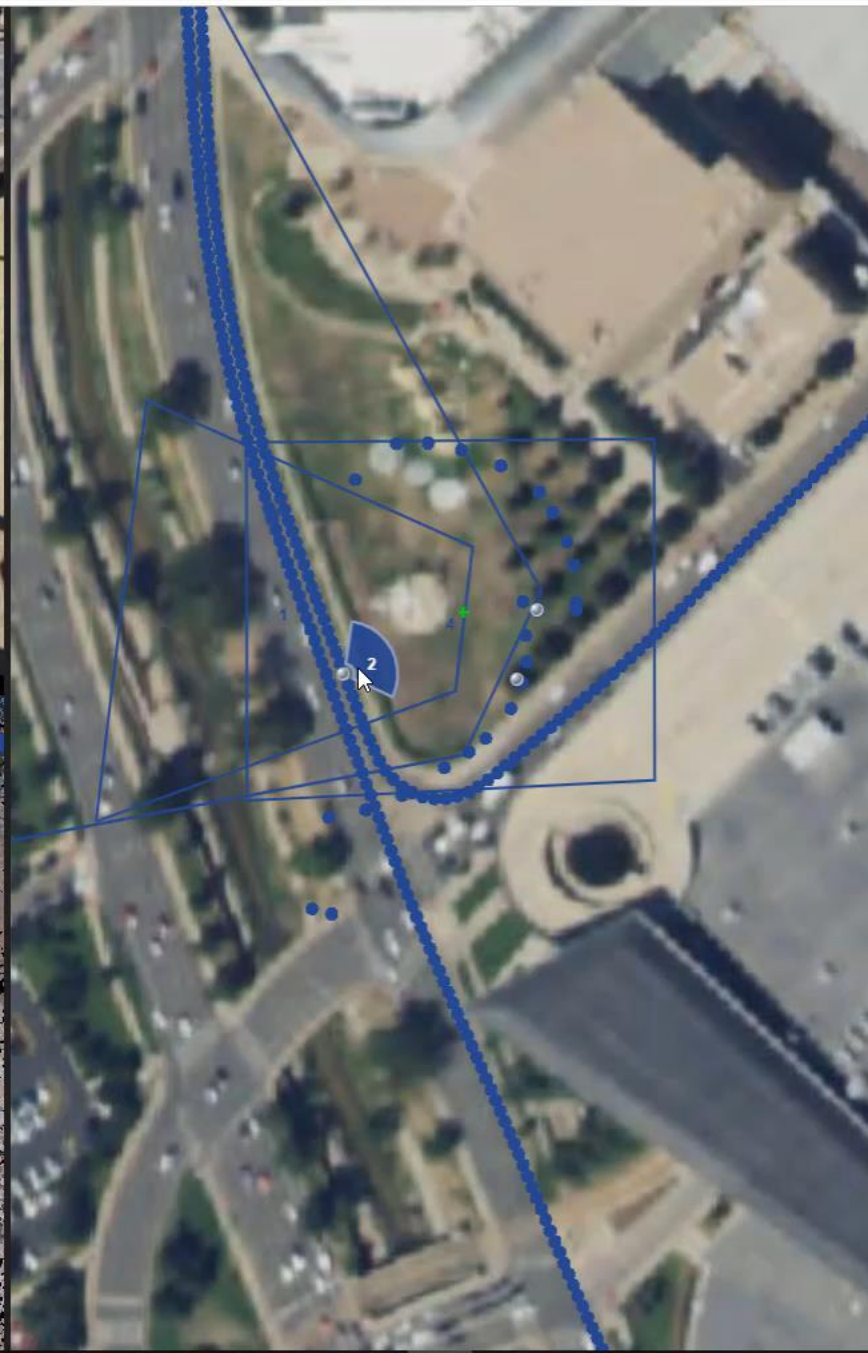


### SHARE DATA with **Orbit 3DM SHARING**

On-Prem 3DM Publisher  
SaaS-based 3DM Cloud  
for organization wide users

- SHARE & PUBLISH ON-PREM & IN CLOUD
- CONSUME VIA WEB
- CONSUME VIA APP
- CONSUME VIA SDK
- PLUGINS / INTEGRATIONS
- EMBED IN WORKFLOW
- SHARE DATA WITH 3rd PARTIES
- INTEGRATE WITH OTHER 3D DATA, GIS







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# Orbit Versions:

- Log on Bentley Connect portal
  - Access Software download / Orbit brand
  - Download Content Manager v. 22.07.00.01
  - Connect version
- 
- 4 releases per year
  - Next version 22.10: end of October 22



Software Downloads



**Orbit 3DM Content Manager**  
Orbit 3DM Content Manager provides management, optimization, and delivery of any 3D Mapping content.

Generation

Version

Language

Architecture

Deliverable Type

Subscription Entitlement <sup>i</sup>

CONNECT Edition

22.07.00.01

English

x64

Installer

Yes

Apply

Clear

**Orbit 3DM Content Manager CONNECT Edition x64 (SES) Update 7 (English) <sup>i</sup>**

Version:22.07.00.01

Date:07/11/2022

Size:337 MB

System Requirements

Support Status

[Download](#)

\*Clear the Default Filters to view more Downloads

# Key feature: Cloud viewer flexibility

## Upload extension

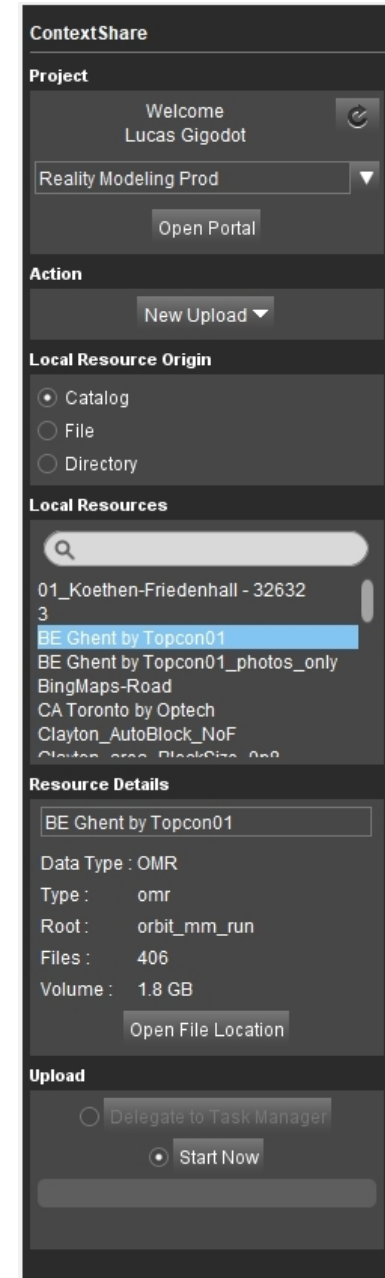
- Bentley IMS login
- Admin console access & guest user viewer access
- From indoor high density to country wide dataset
- Publication resource display:
  - Resource grouping
  - Timeline (acquires at different dates)
  - Floor map



# Recent feature: upload to ContextShare

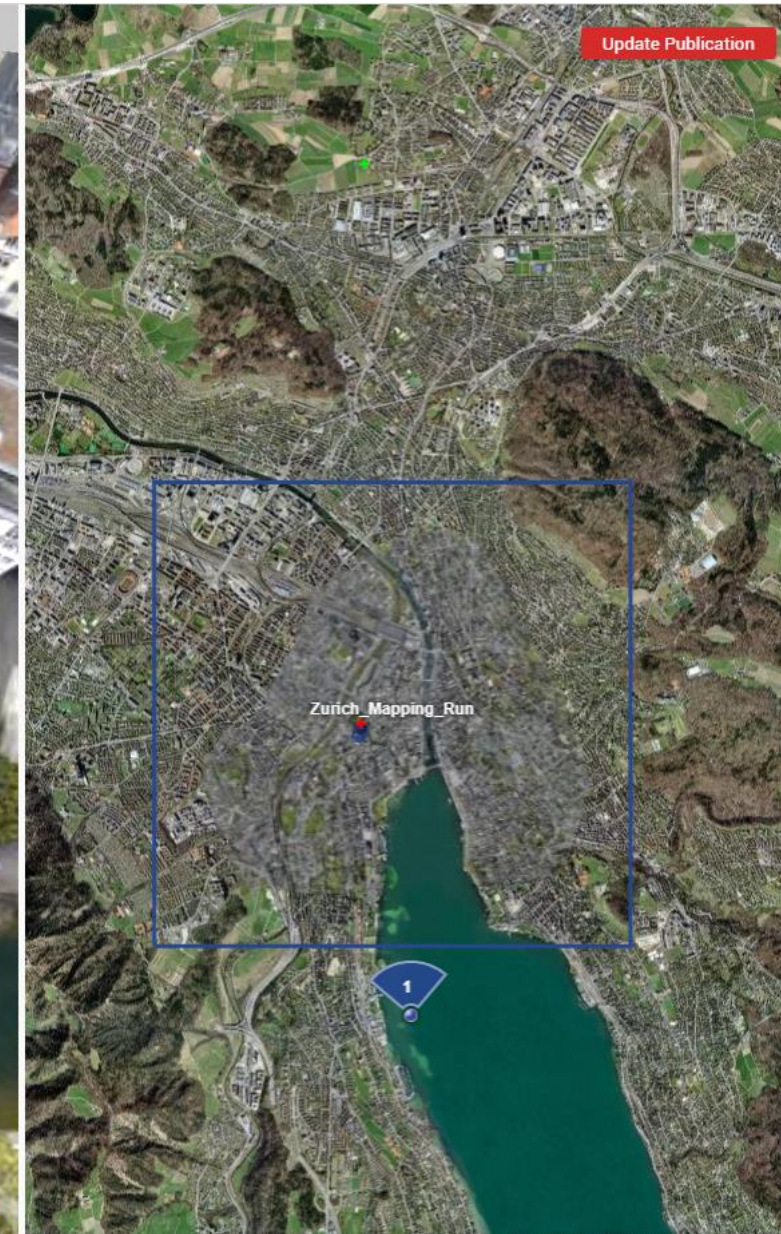
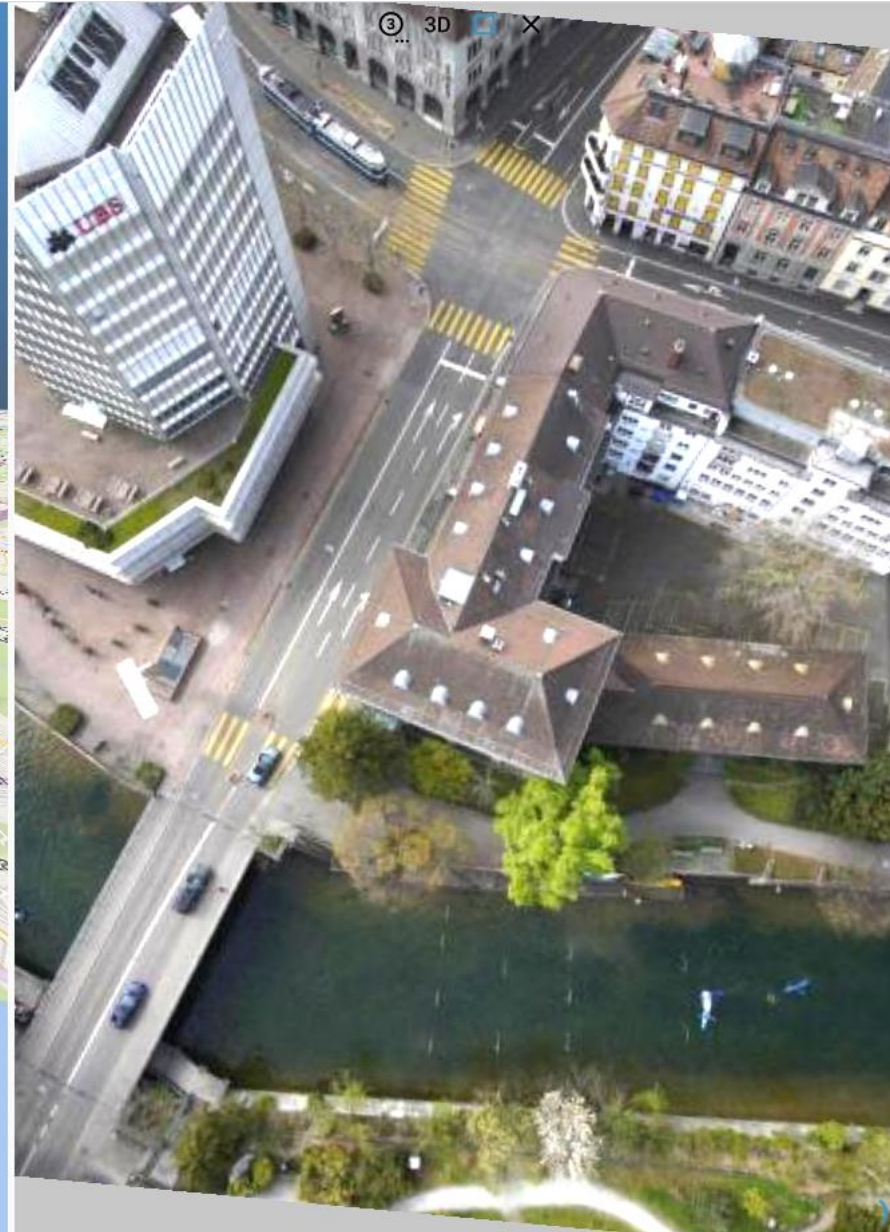
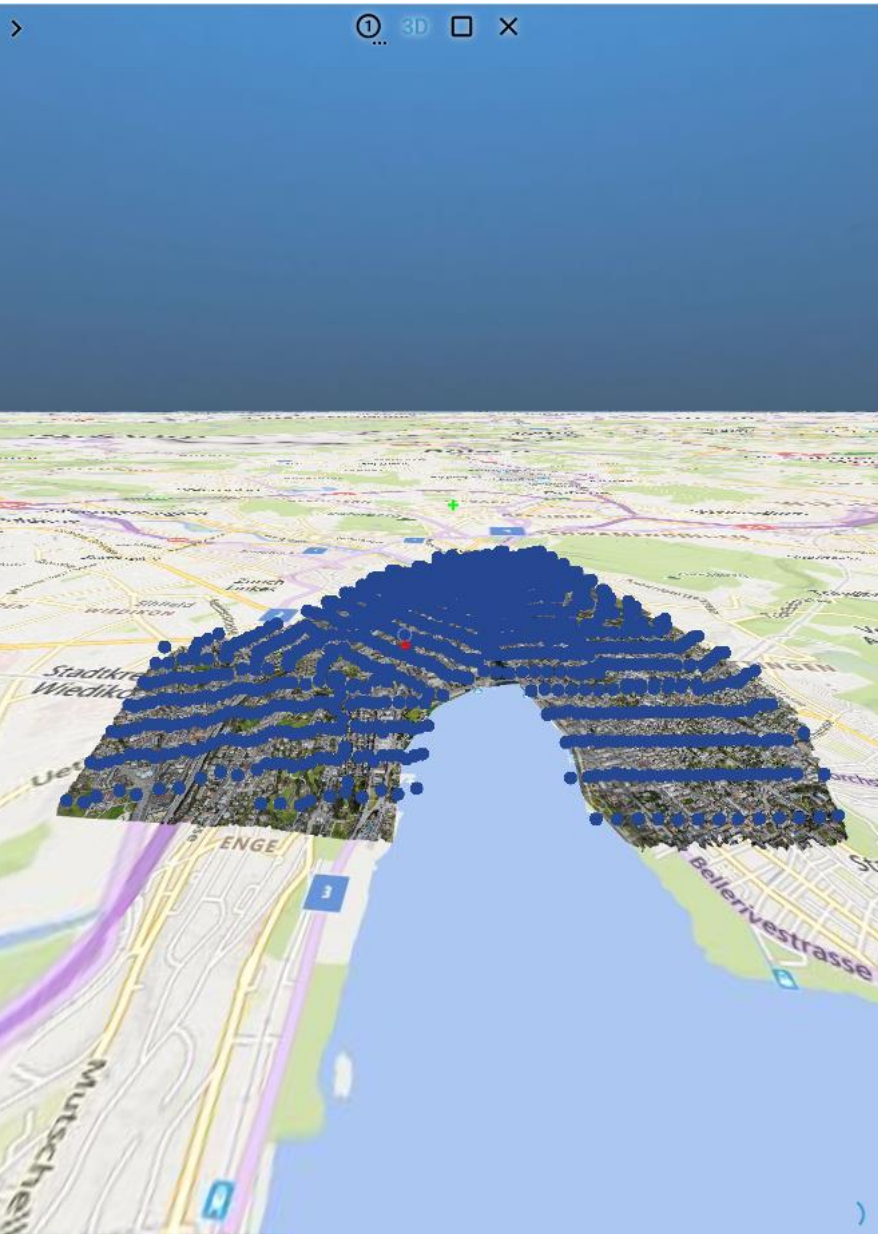
## Upload extension

- Sign into Bentley Connect
- Action
  - New/Update/Delete/Download
- Choose Resource Type
- Resource Details – Name/Rename
- Upload





# Examples: Toronto & Zurich







# Geospatial Keynote Q&A

Thank you! Any question?

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