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Laying the foundation: Imagery technology for DT

Alberto Meroni, Business Development Manager, Imagery & RS

High Level Training on Digital Twin applications in Port ecosystems, Venice 28th Jan 2025

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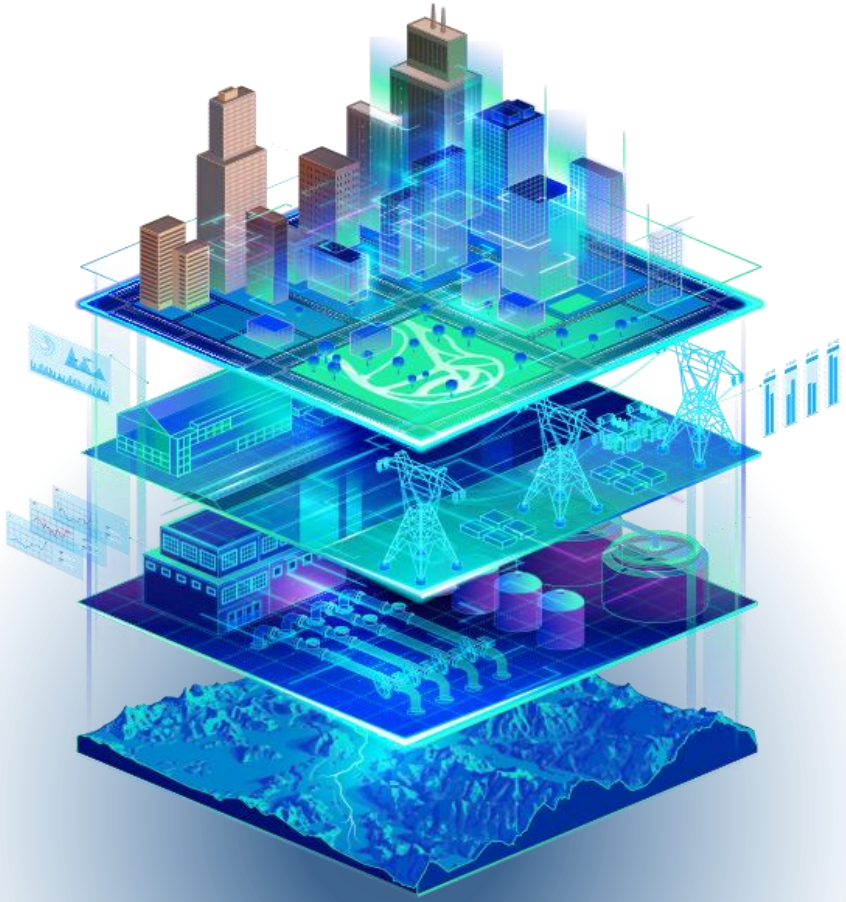
The Role of Imagery in Digital Twin journey

Enabling the digital representation of a Physical Asset, Infrastructure, Port and more



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How overcome the 3D barrier?

Reality Mapping

The process of creating accurate digital representations of the physical world using images, lidar, or both.

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Plan

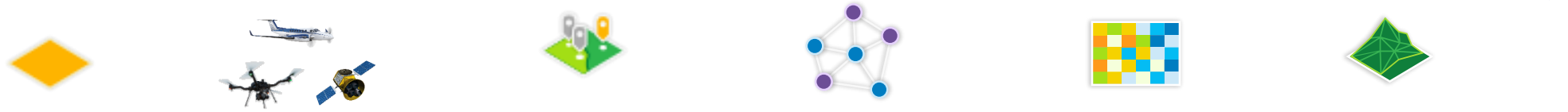
Collect data

Oriented imagery

Adjust (AT)

True-Ortho DSM

3D Reality Mesh



Reality Mapping

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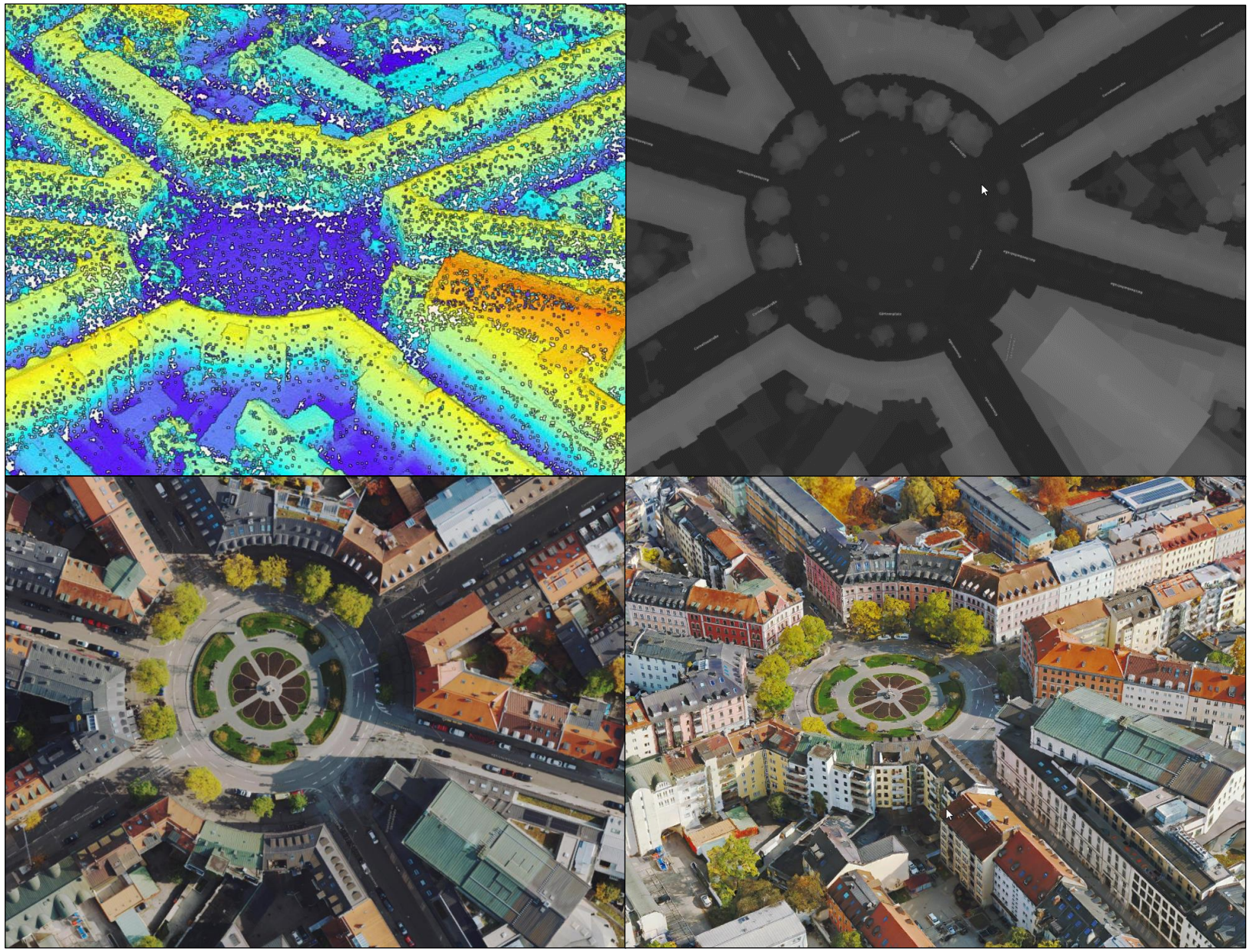
The fundamental products for digital representation

- Point Cloud
- DSM
- True-Ortho
- 3D mesh models



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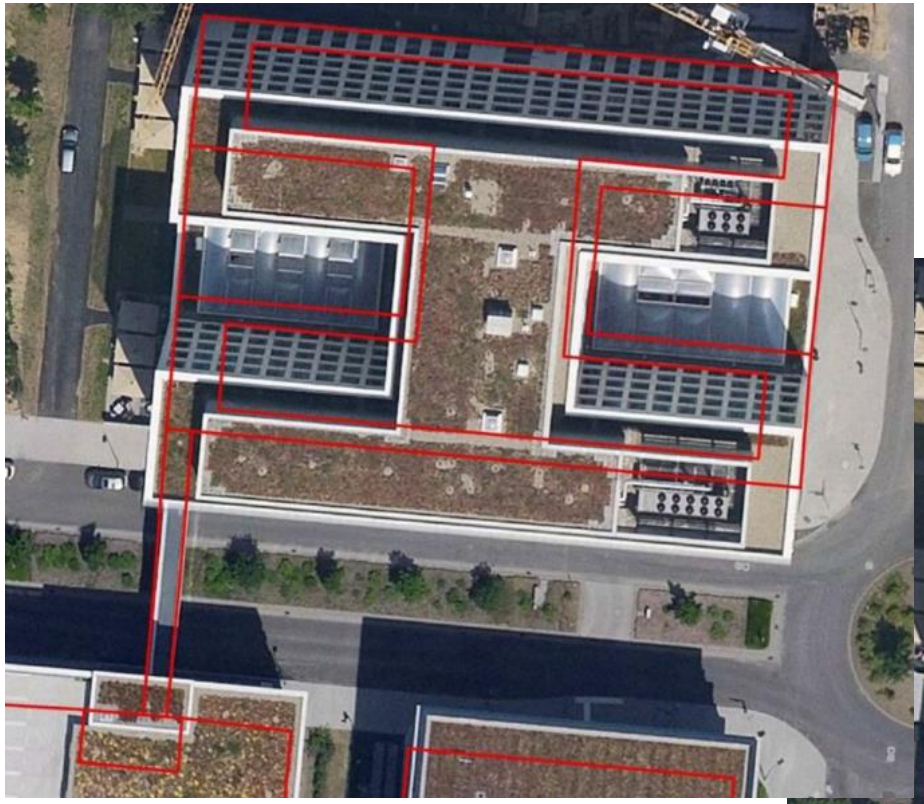
The fundamental products for digital representation:

True-Ortho



Traditional Orthomosaic

True Ortho

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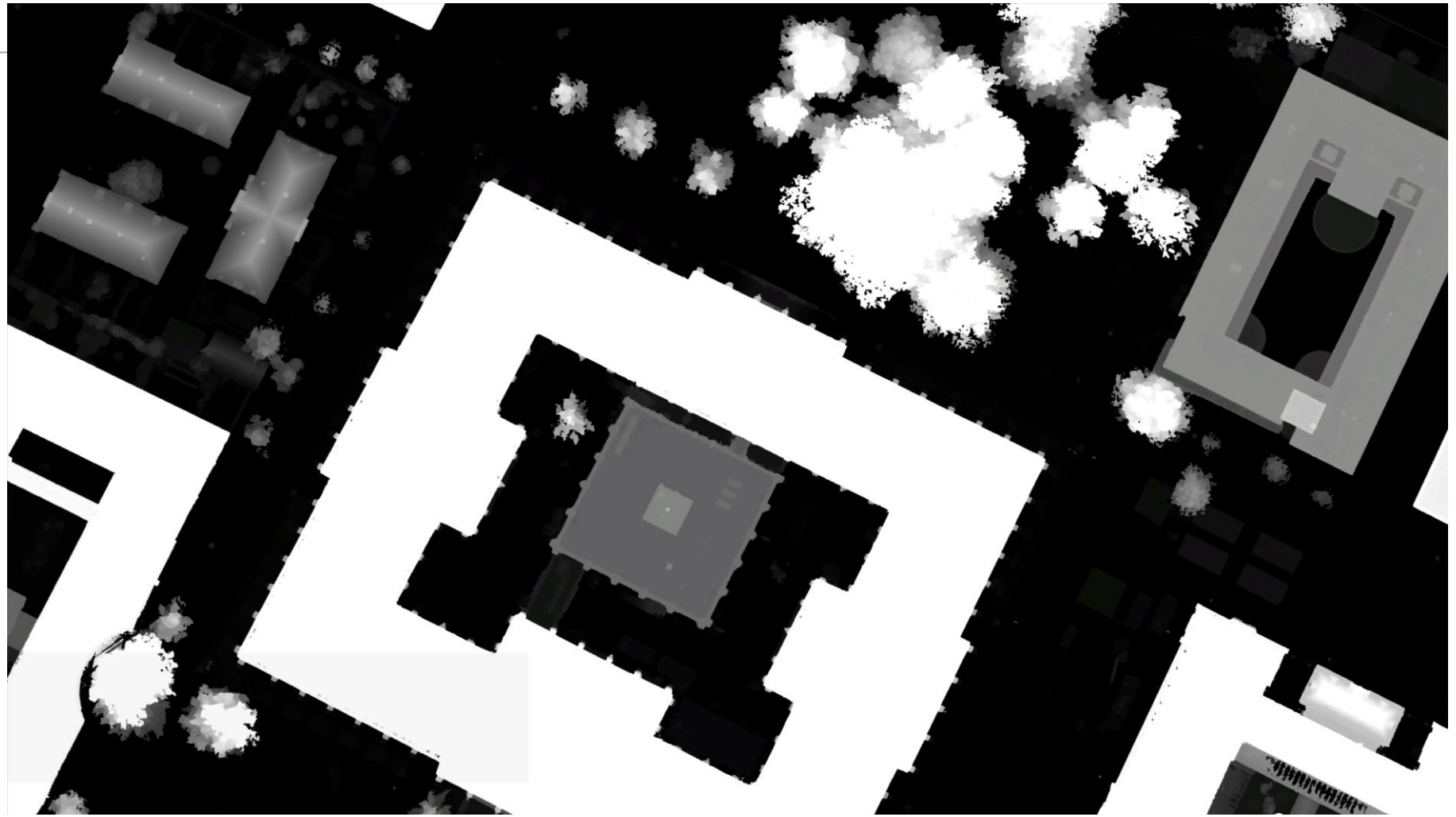
The fundamental products for digital representation:

DSM

Digital Surface Model



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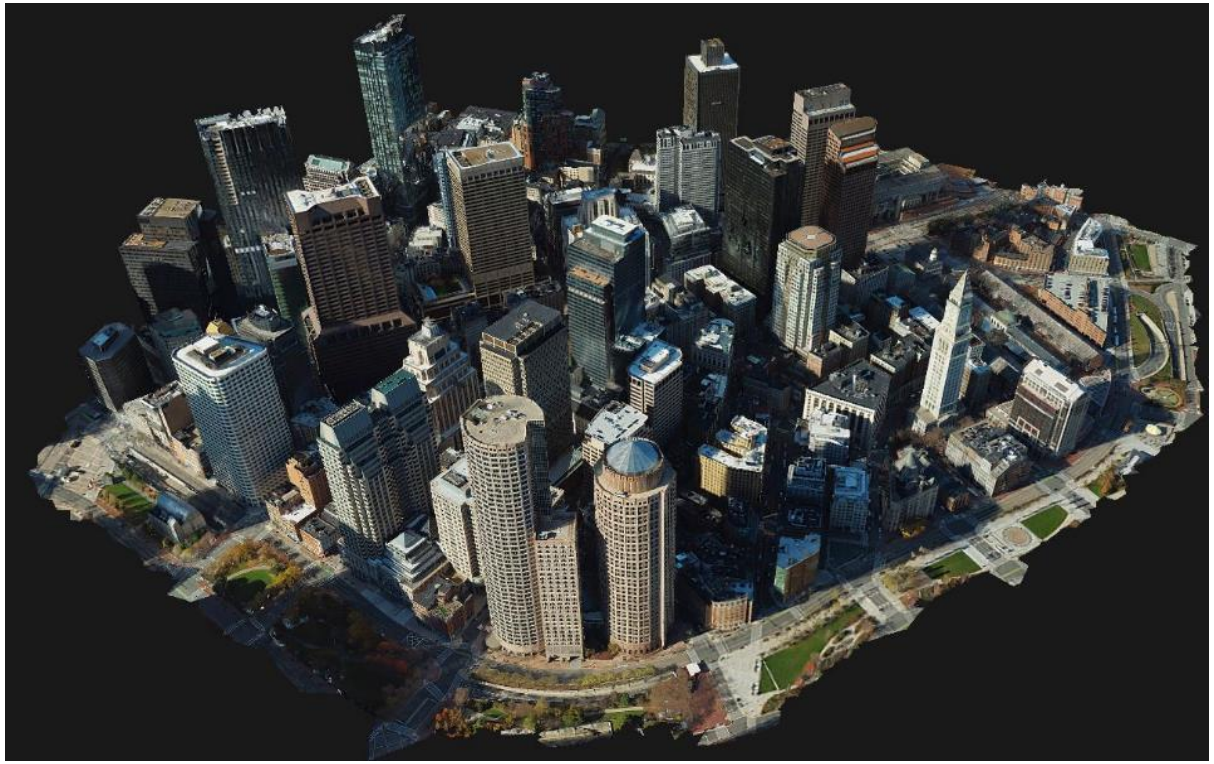
The fundamental products for digital representation:

Point cloud & 3D Mesh

Image matching point cloud

Reality 3D mesh model (3D orthophoto)



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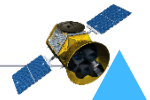


30+cm GSD

2-25cm GSD

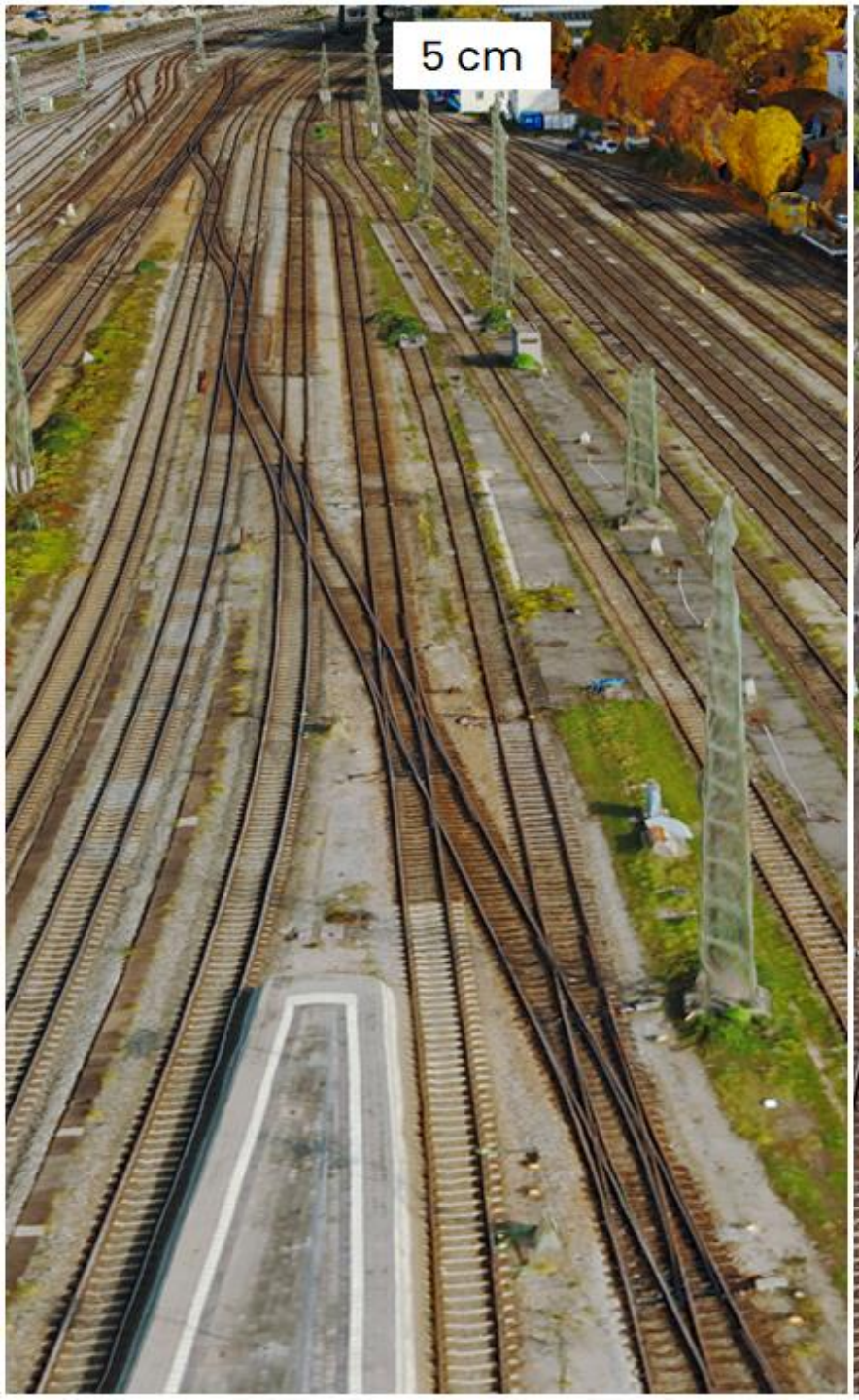
<2cm GSD

Data courtesy Airbus, Pleiades Neo, GSD 30 cm

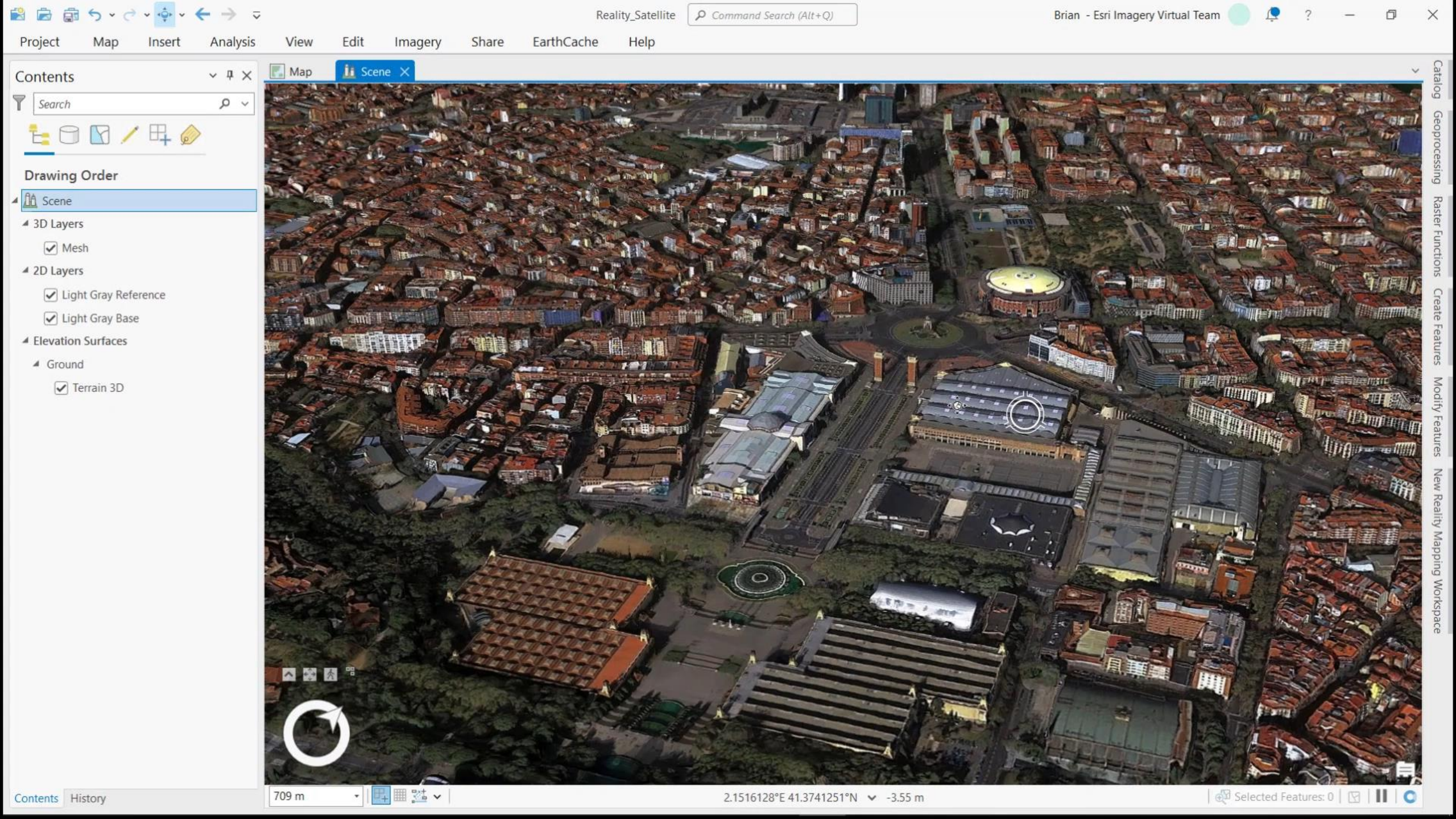
Data courtesy City of Milano, CGR SPA & Esri Italy, GSD 5 cm

Data courtesy HNIT Baltic, GSD 1 cm

10 cm


5 cm

2.5 cm
Esri Confidential

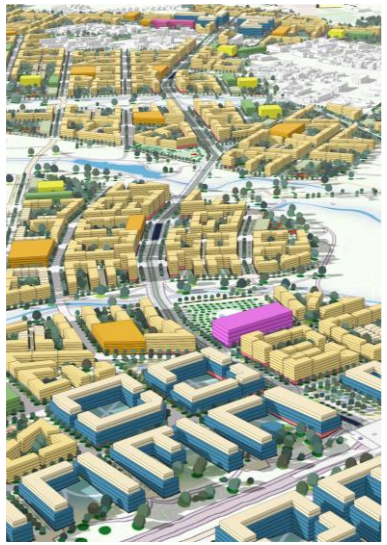

Reality_Satellite
Command Search (Alt+Q)
Brian - Esri Imagery Virtual Team
Project
Map
Insert
Analysis
View
Edit
Imagery
Share
EarthCache
Help
Contents
Search
Drawing Order
Scene
3D Layers
Mesh
2D Layers
Light Gray Reference
Light Gray Base
Elevation Surfaces
Ground
Terrain 3D
Map
Scene
Catalog
Geoprocessing
Raster Functions
Create Features
Modify Features
New Reality Mapping Workspace
709 m
2.1516128°E 41.3741251°N
-3.55 m
Selected Features: 0
Contents
History

Drone, Aerial, Satellite

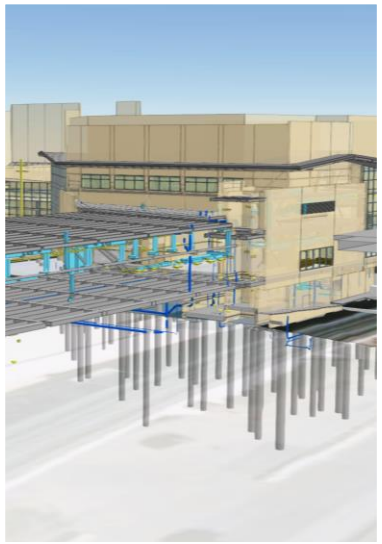
City of Boston - Data courtesy of Bluesky International Limited
Water f
Maxar | Source: Airbus,USGS,NGA,NASA,CGIAR,NLS,OS,NMA,Geodatastyrelsen,GSA,GSI and the GIS User Community | Data courtesy of Bluesky International Limited - Processed with the ArcGIS Reality Engine
Powered by Esri

Reality Mapping in “Analyze”
Data courtesy of: Portcoast

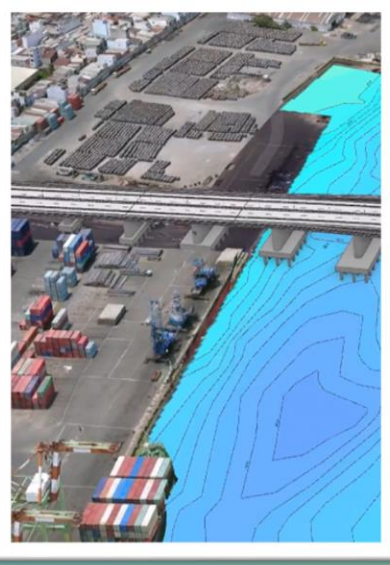
Environmental



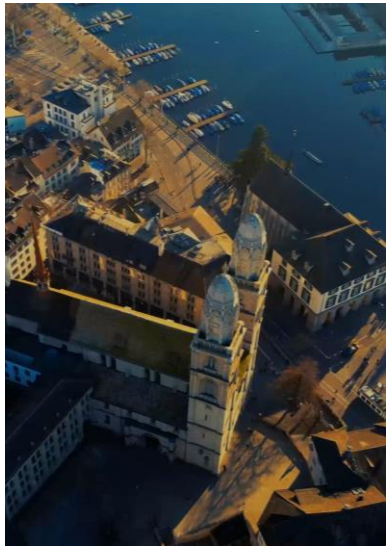
Urban planning



AEC



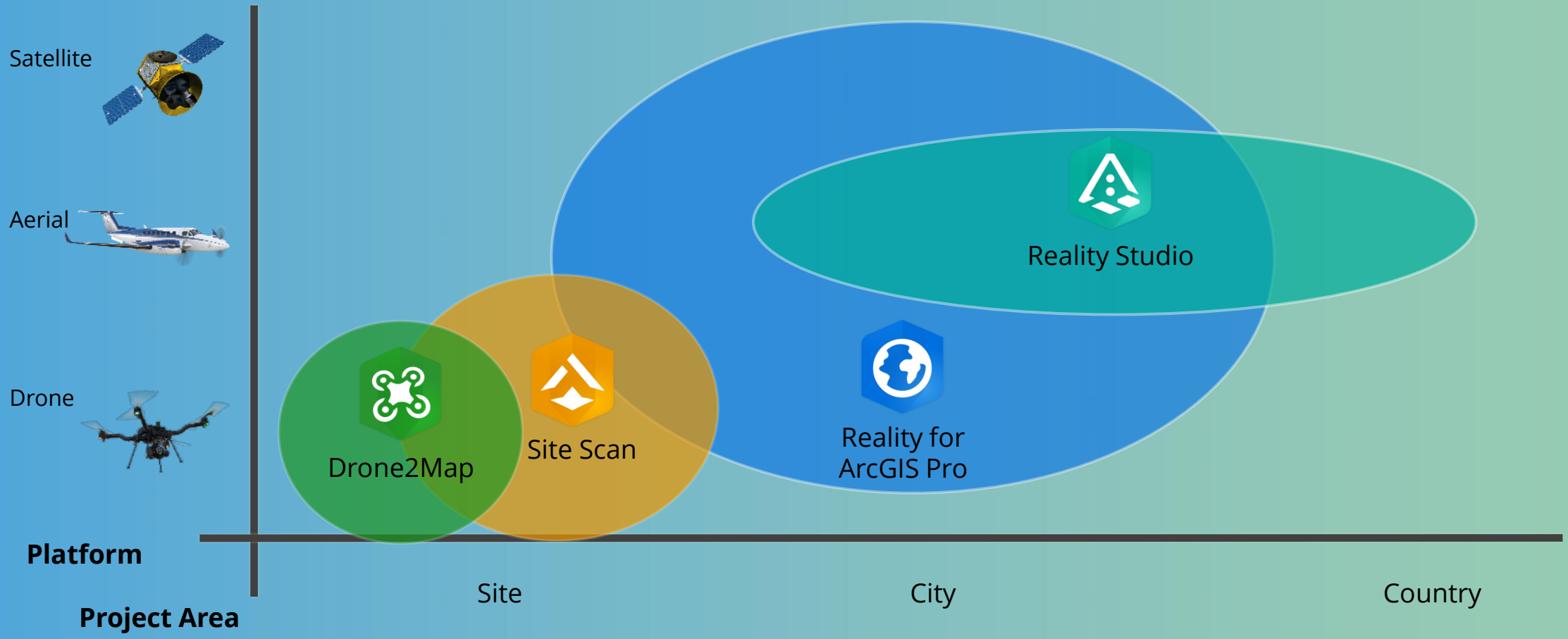
Utilities



Real time (IoT)

True-Ortho & 3D Reality Mesh

ArcGIS Reality
Product Family



Conclusions

Imagery for Digital Twin:

- A cost-effective method for building foundational data layers.
- The process is highly automated.
- The results can be used in a wide range of engineering and GIS applications.

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