



ArcGIS is a Foundation for Digital Twins

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2024 SCAUG – Frisco, Texas

What is a Digital Twin ?



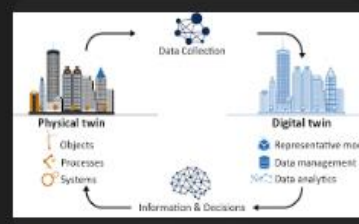
- Manufacturing
- Technology
- Simulation
- Building
- Factory
- Siemens
- Human
- Supply chain
- Artificial intelligence
- IoT
- Metaverse
- Industrial
- Gis
- Esri
- Healthcare
- Symbol
- Construction



Reliable Plant
Digital Twins and AI: Transforming ...



TechTarget
What is a digital twin and how does it ...



Arrival 3D
Digital Twins from 3D Scanning - Arrival 3D



XR Today
What Are Industrial Digital Twins And ...



PTC
What is Digital Twin and why is it ...



Geospatial World
Demystifying Digital Twins



PQS Tech
Digital Twins- What are they a...



12d Synergy
Digital Twins Exp...



SCIO Automation
Digital Twin ...



Network World
What is a digital twin and why is it ...



Trimble Construction
Digital Twins in Construction ...



IOT Insider
Defining digital twins and their many ...



Bench International
Your Digital Twin : Create the ...



BBC
digital twin within a decade ...



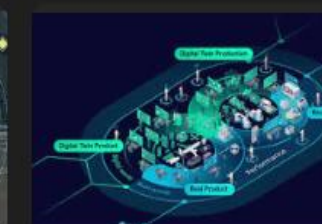
SDxCentral
How digital twins and AI optimize IT ...



ABB
The digital twi...



TechTarget
What is a digital twin and how does it ...



Siemens Blog
The "comprehensive" digital twin - what ...



DigiKey
The Digital Twin Concept and Ho...



Softengi
Digital Twin Use Cases and Applicatio...



Facility Executive Magazine
Optimize With Digital Twin Technology



NXP Semiconductors
Digital Twins Transforming Automotive ...

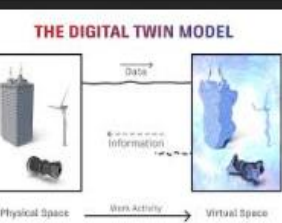
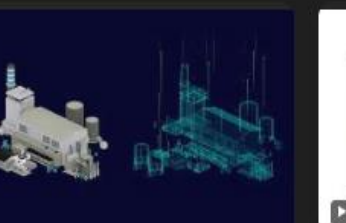


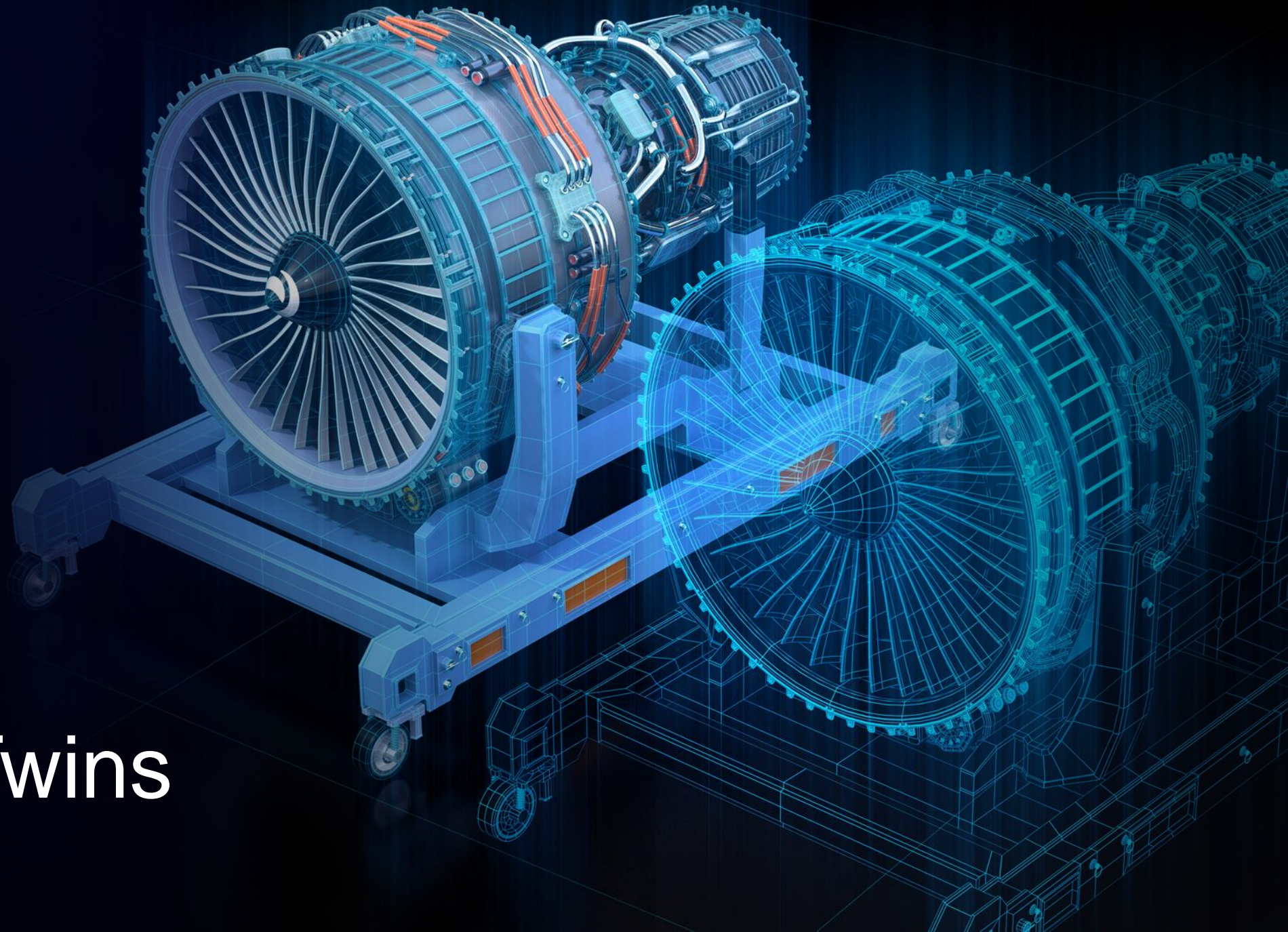
Autodesk
Digital Twin Technology & Software ...



Autodesk
Digital Twin Technology & Software ...

- Related searches
- digital twin building
 - technology digital twin





Digital Twins

Gartner Survey: Digital Twins Are Entering Mainstream Use

\$48B

estimated industry
value by 2026

75%

use or plan to use
digital twins

13%

already using a
digital twin

1/3

of respondents
say digital twins

\$150B

estimated industry
value by 2030

62%

already using a
digital twin

1/2

of respondents
say digital twins
serve multiple
constituents

Business-process Problems

| Business Problem | Core Area |
|---|--------------------------------------|
| Increasing demand to support movement of people and goods . | Mobility |
| Respond to a rapidly changing environment that is causing increased occurrence of natural disasters. | Disaster Response & Climate Response |
| As populations grow and shift geographies there is a demand for a more sustainable source of power | Energy |
| Cities are becoming increasingly complex and most are built on infrastructure and services that are struggling to keep up. | Smart Cities |
| Buildings and Facilities are struggling to keep up with changing demand for use. | Smart Facilities |
| Clean and accessible drinking water should be available to everyone. | Water |

3 Key Breakthrough Technologies



Cloud Collaboration



AI and ML



Game Engines



Creating Smart Digital Realities



Landscapes
Environment

Facilities
Buildings
Plants & Structures

Networks
Pipelines
Utilities / Telecom
Roads & Highways

Cities
Planning
Event Security
Community

Building from Existing Approaches



TURBINE 737

 **0 kW**
PRODUCTION

TURBINE 781

 **0 kW**
PRODUCTION

TURBINE 167

 **0 kW**
PRODUCTION


  



TURBINE 822

 **28 kW**
PRODUCTION

TURBINE 721

 **36 kW**
PRODUCTION

TURBINE 601

 **34 kW**
PRODUCTION

ArcGIS

Enables Digital Twins

1

Data Capture & Integration

- Data Modeling
- System Integration
- Reality Mapping
- Information Management

2

Real Time & Visualize

- Dashboards & Reporting
- Real-Time
- Analytics
- Visualization

3

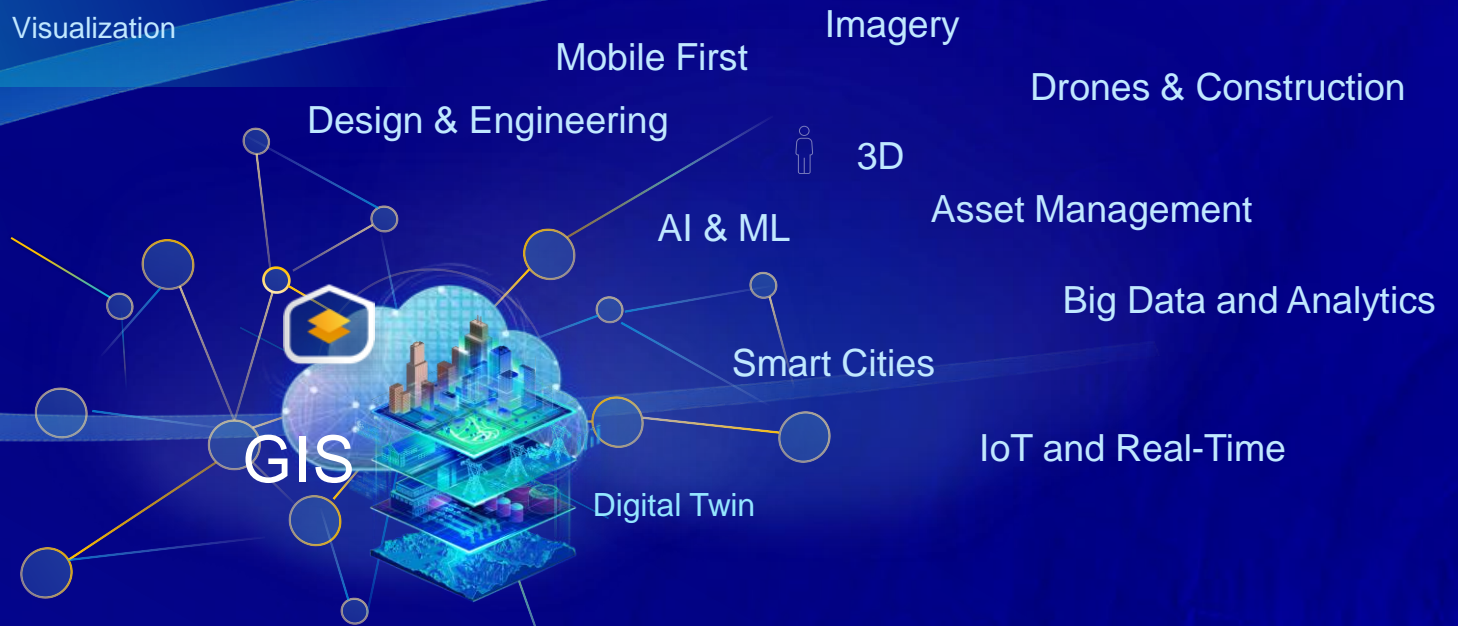
Analyze & Predict

- Automation (AI / ML / DL)
- Modeling
- Simulation
- Forecasting

4

Share & Collaborate

- Engagement
- Collaboration
- Data Access
- Information Sharing



... Modeling the Complete Lifecycle

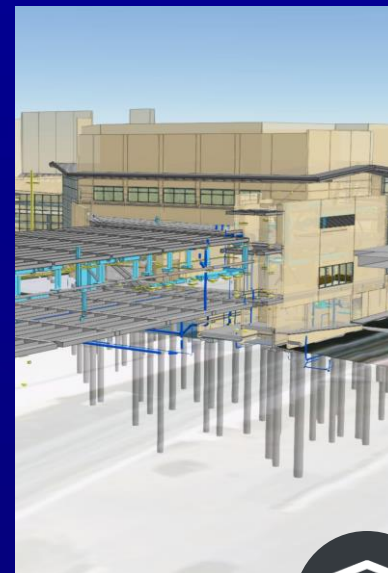
Applications & Solutions



Environmental Hub



Spatial Planning



Design / Construction



Operations



Reality / DataCapture

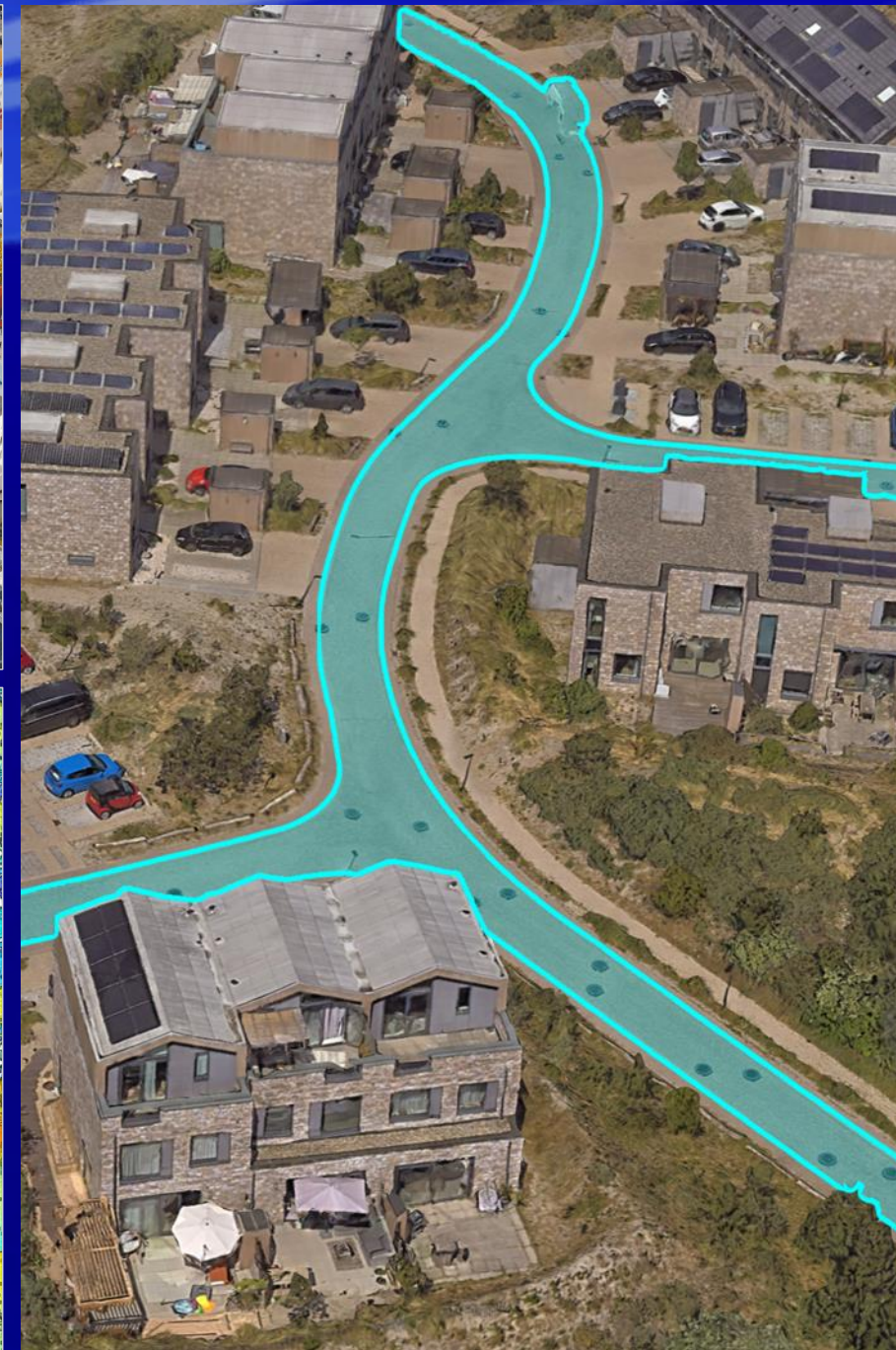
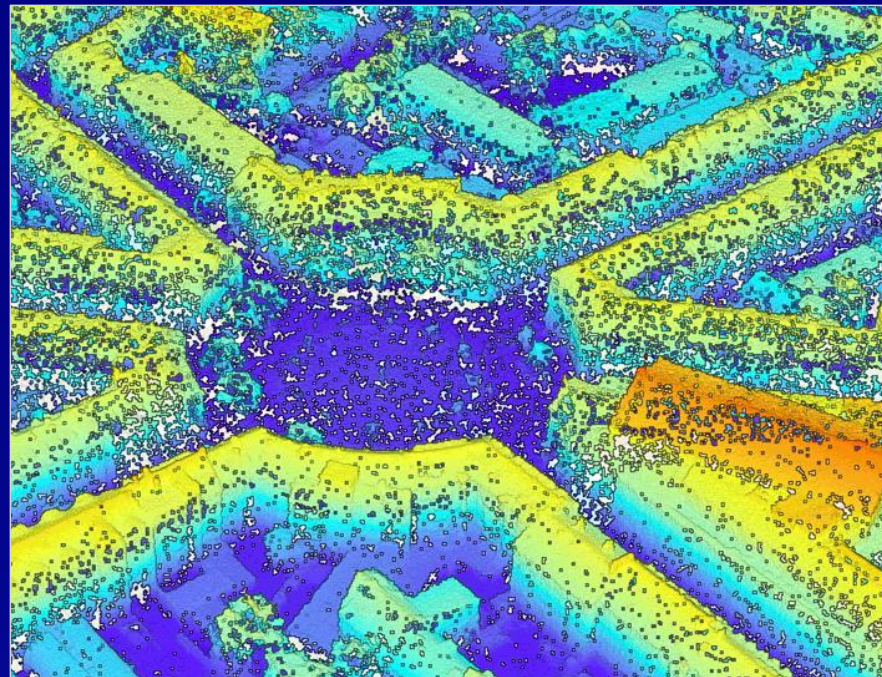




Reality Capture

- Production tools to generate 3D Meshes (SLPK), True Ortho, DEM Point Clouds
- Import and publish Revit (BIM), networks, and infrastructure layers
- Provide an aggregated baseline for demographics and human movement

Primary applications:



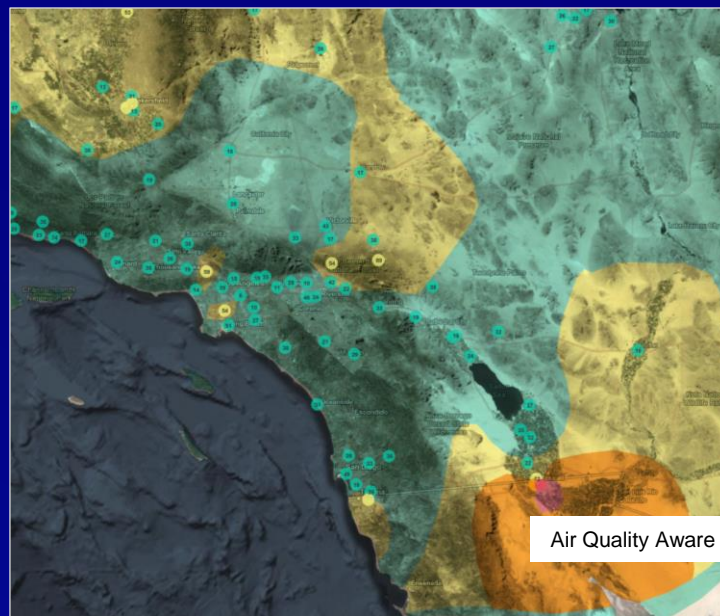
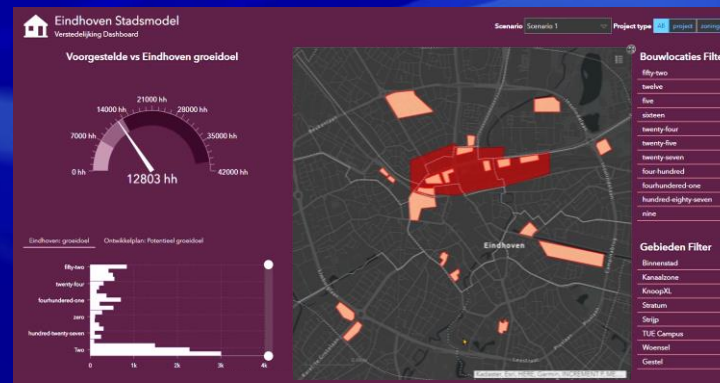




Environmental Hub

- Visualize local climate trends / extremes
- Summarize and score environmental vulnerability on Noise, Heat, and Pollution (air quality)
- Establish indicators for hazard risk evaluation that show the impacts for ongoing plans and projects
- Measure Sustainability Performance

Primary applications:



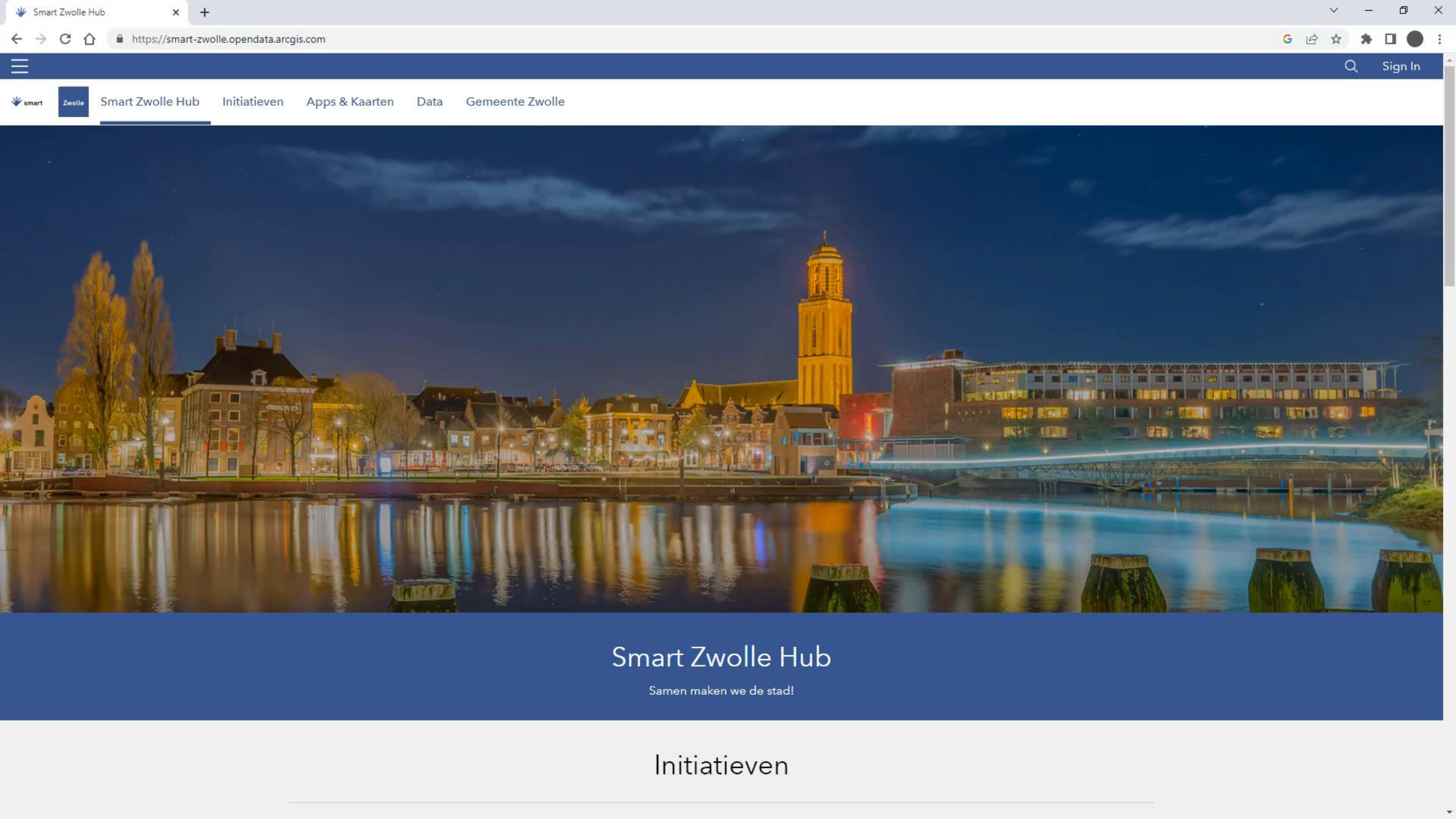
Explore the Sustainable Development Goals card below to access progress reports and indicator data relating to a part

2 ZERO HUNGER
Sustainable Development Goal 2 Progress, Ireland
See Ireland's progress towards ending hunger, achieving food security, improving nutrition a...

3 GOOD HEALTH AND WELL-BEING
Sustainable Development Goal 3 Progress, Ireland
See Ireland's progress towards ensuring healthy lives and promoting well-being for all, a...

6 CLEAN WATER AND SANITATION
Sustainable Development Goal 6 Progress, Ireland
See Ireland's progress towards ensuring the availability and sustainable management of...

7 AFFORDABLE AND CLEAN ENERGY
Sustainable Development Goal 7 Progress, Ireland
See Ireland's progress towards ensuring access to affordable, reliable, sustainable and mode...



Smart Zwolle Hub

Samen maken we de stad!

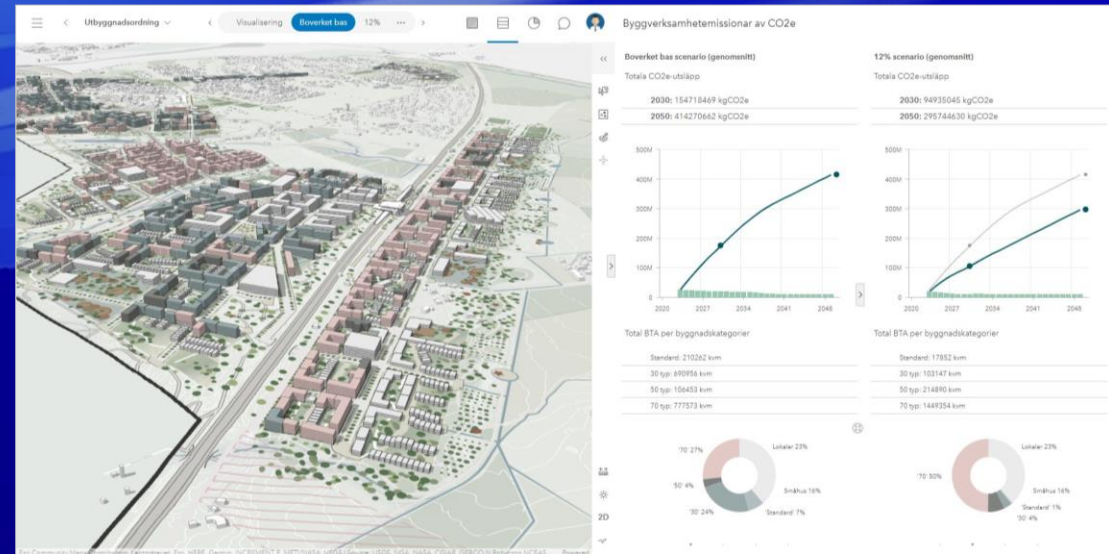
Initiatieven



Spatial Planning

- Overlay major plans and projects on a citywide Urban Model
- Design and iterate master plan scenarios based on defined strategies
- Establish KPI dashboards for evaluation (accessibility, financial performance, tax revenue, etc.)
- Create a walkthrough of proposals with Unreal Engine / XR

Primary applications:



Search... 



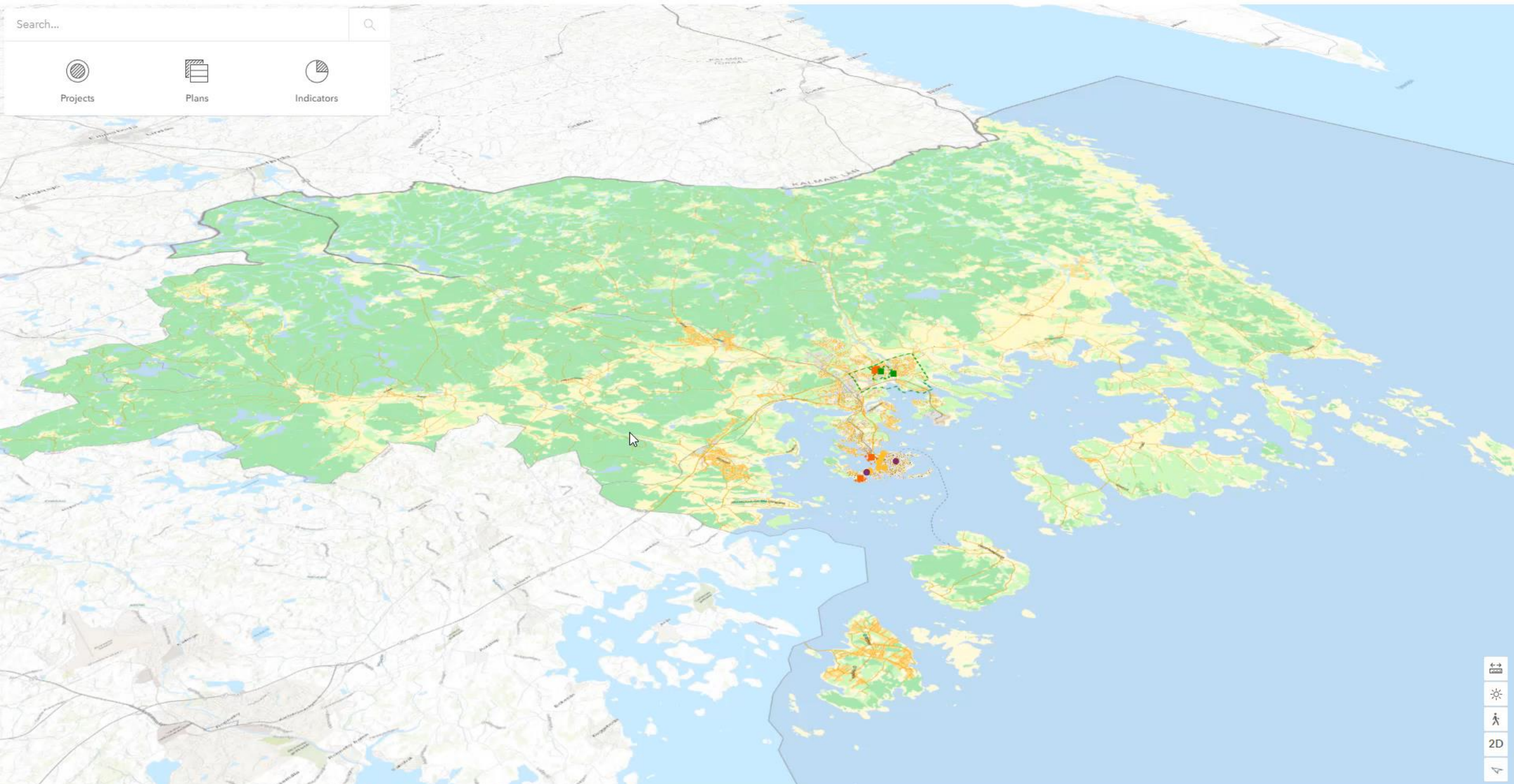
Projects



Plans

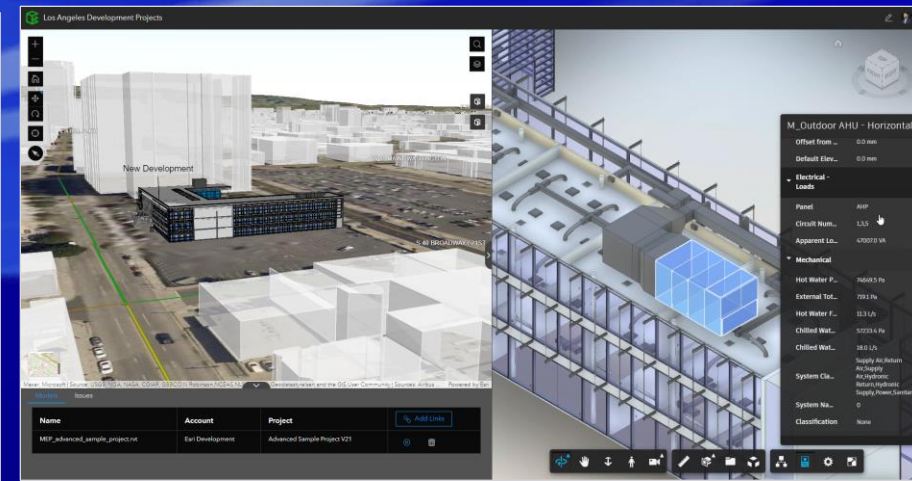
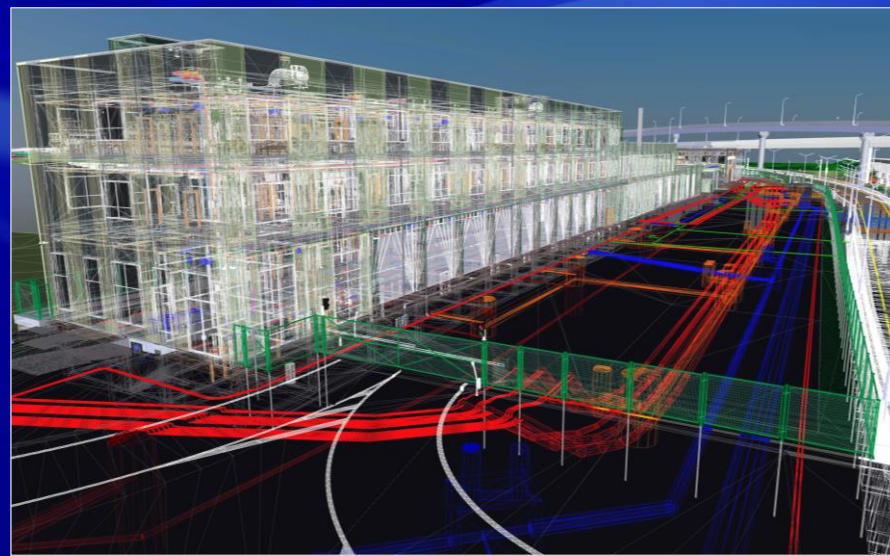


Indicators

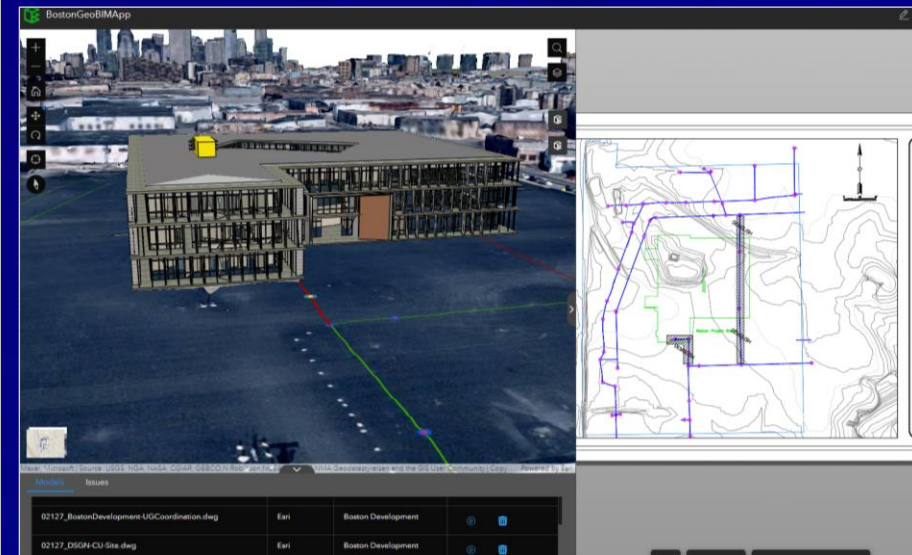
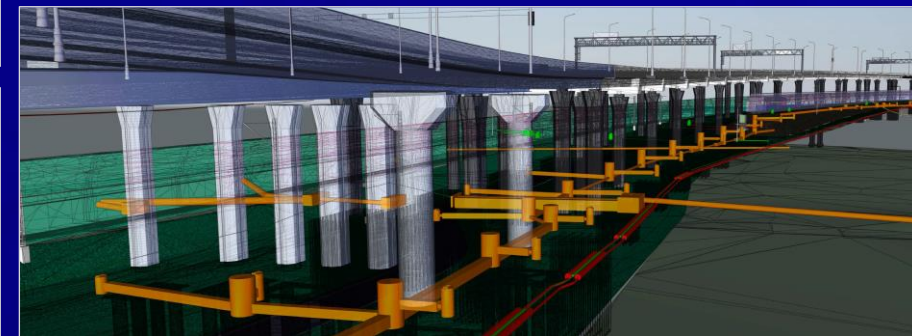
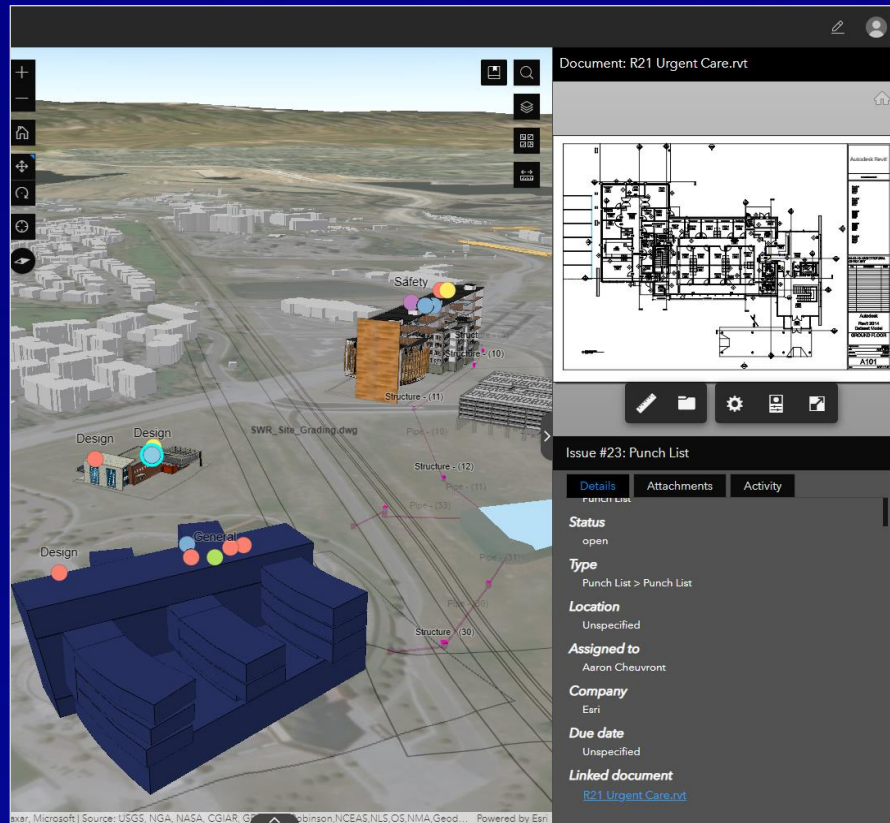




Design & Construction



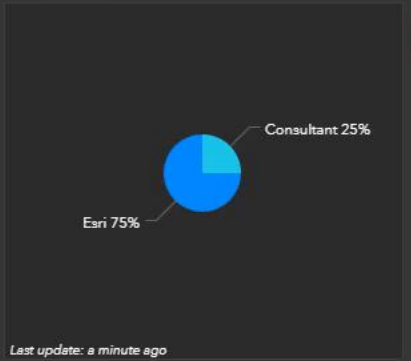
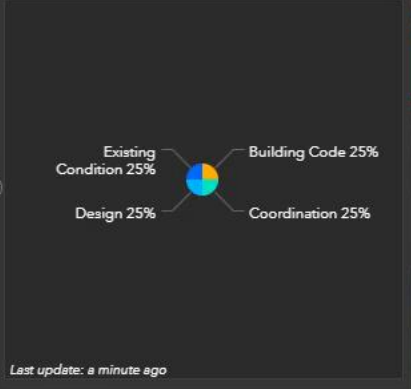
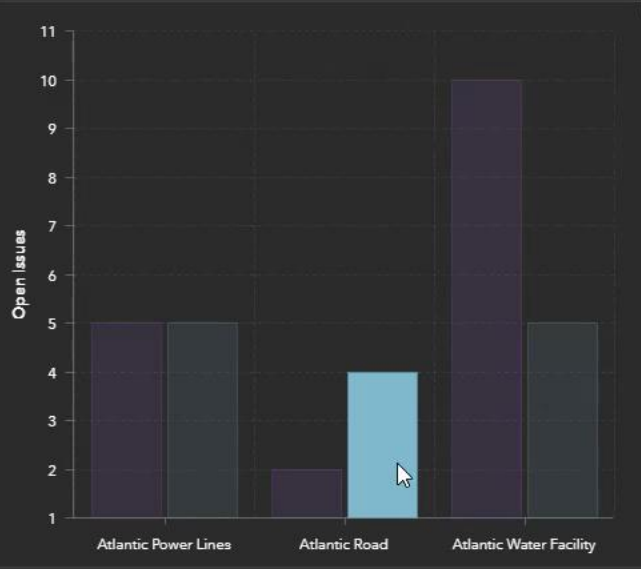
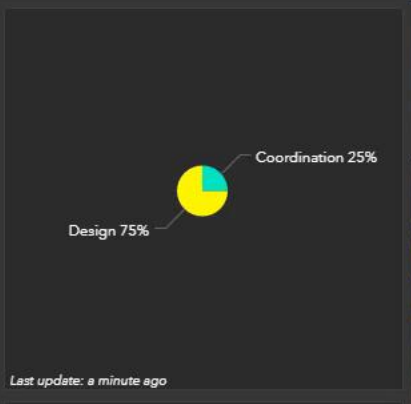
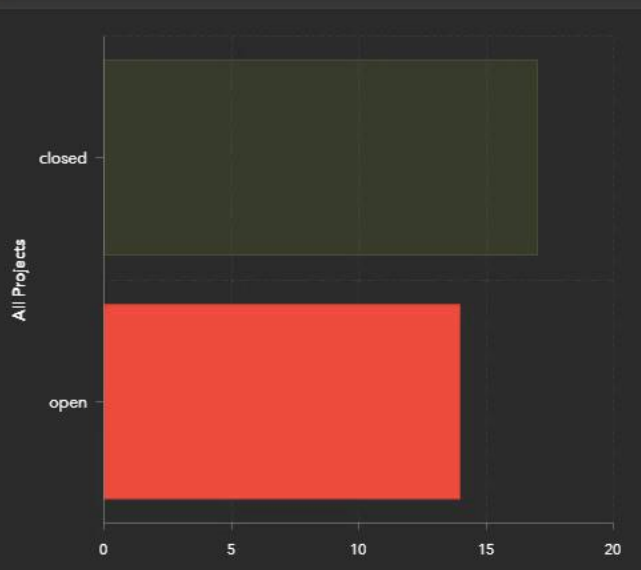
- Visualize Building Scene Layers within a citywide mesh
- Connect to Autodesk Construction Cloud and BIM 360
- Support an integrated visualization and query of assets in context
- Share project status and issues through a common dashboard



Primary applications:



My Projects Status Dashboard



Link Explorer

Add Links

| Name | Account | Project |
|---------------------------------|---------|---------|
| No linked documents to display. | | |

Issues

Search

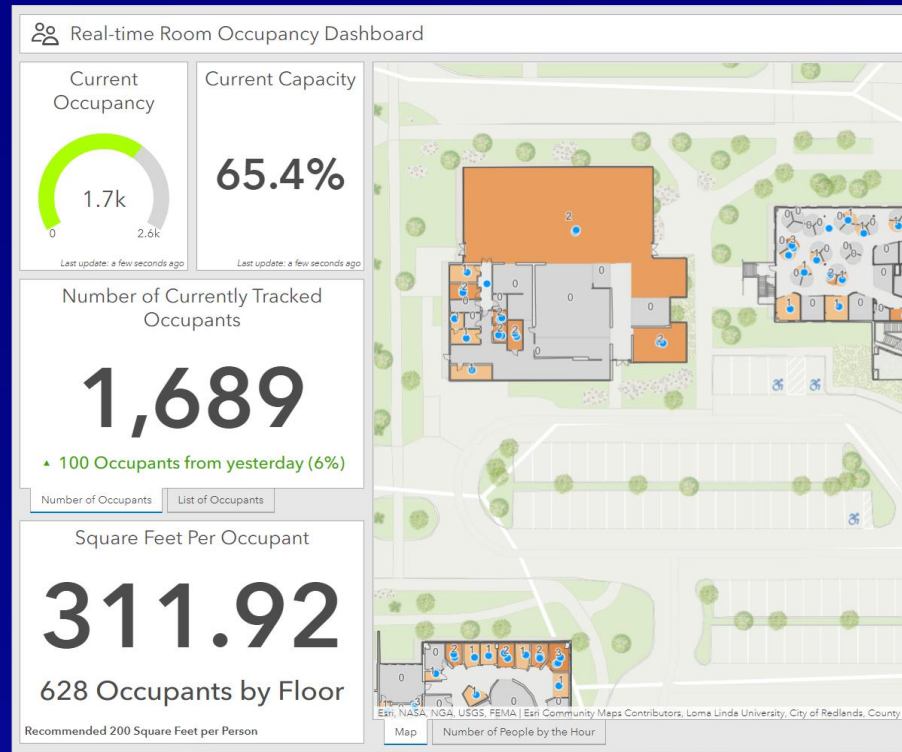
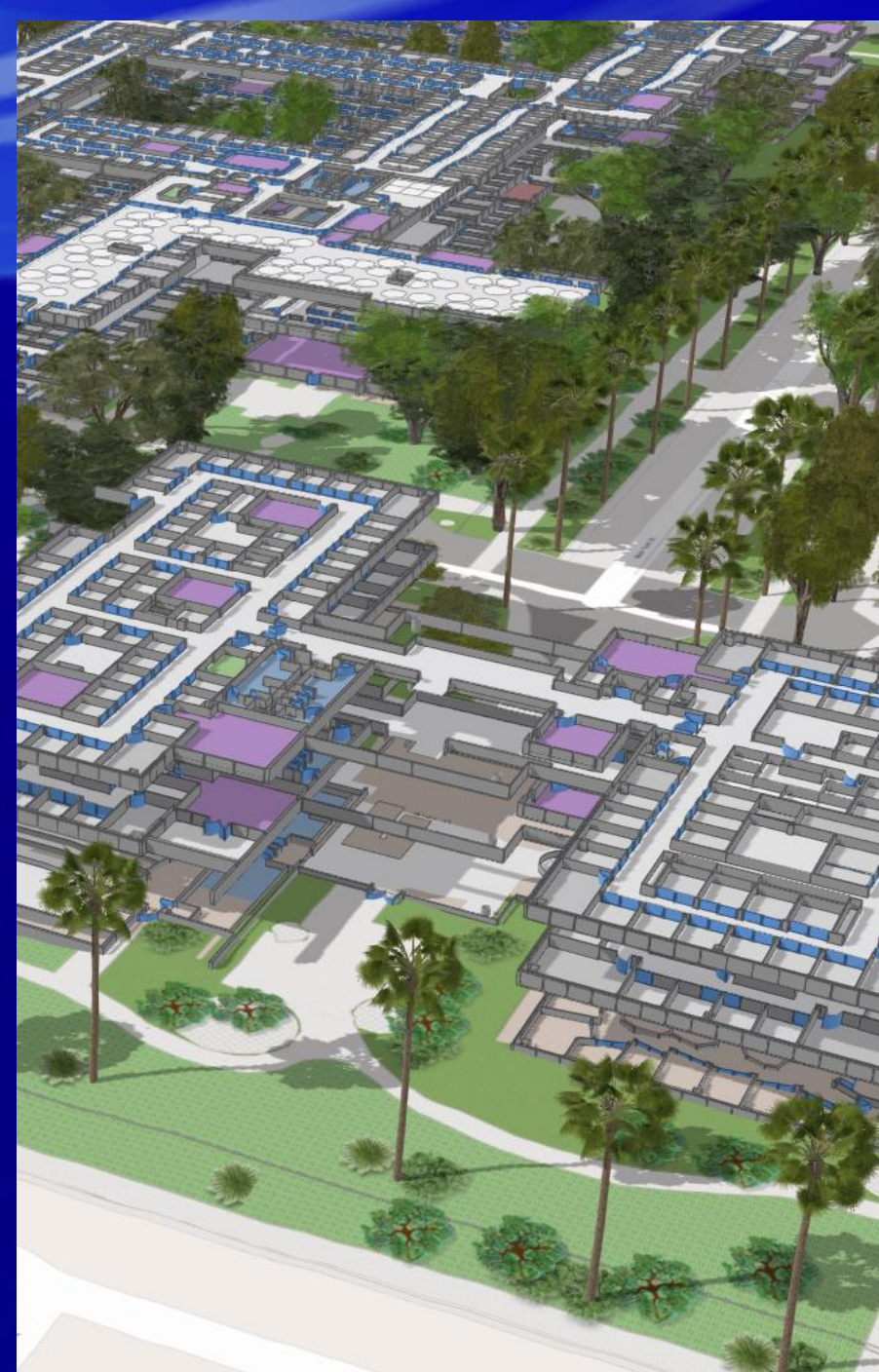
| Project Name | Issues # | Status |
|---------------|----------|--------|
| Atlantic Road | 11 | open |
| Atlantic Road | 13 | open |
| Atlantic Road | 12 | open |
| Atlantic Road | 14 | open |



Operations

- IoT Integration
- Predictive Analysis
- Traffic Management
- Facility Management
- Asset Management
- Operations and Maintenance
- Wayfinding

Primary applications:







An aerial photograph of a dense city skyline, likely New York City, with numerous skyscrapers and buildings. The image is overlaid with a semi-transparent blue filter. The text is positioned in the upper left and middle sections of the image.

What is a ...?

Smart Cities is the concept of integrated urban development and engagement
... by introducing digital innovation.

Digital Twins are virtual representations of the real world
... including physical objects, processes, relationships and behaviors.

GIS creates digital twins of the social, natural, and built environment
... and uniquely integrates and interconnects many types of digital models.

Additional Resources

- Resources

- 3D Capabilities Website <https://www.esri.com/en-us/capabilities/3d-gis/overview>
- Documentation <https://doc.arcgis.com/en/3d/workflows/help/what-are-3d-workflows.htm>
- Blogs <https://www.esri.com/arcgis-blog/?s=#3D&categories=3d-gis&from=05-19-2021&to=05-18-2023>
- Training <https://www.esri.com/training/catalog/search/>
- Esri Community <https://community.esri.com/t5/3d/ct-p/3d>

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- Instagram @ArcGISApps

- Contact Us

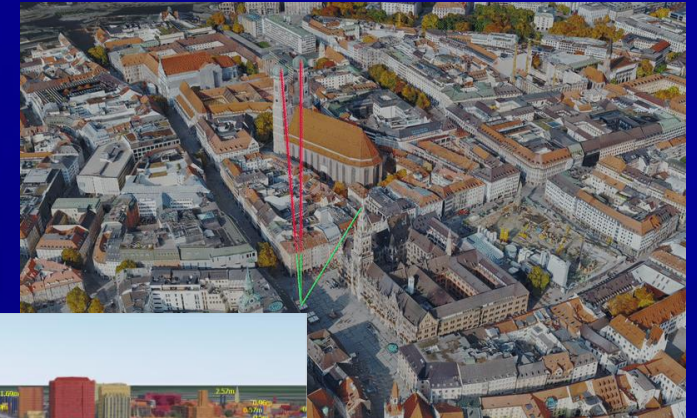
- ArcGISProducts@esri.com



Cumulative shadows



Flood impact



Persisted line of sight



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**THE
SCIENCE
OF
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