



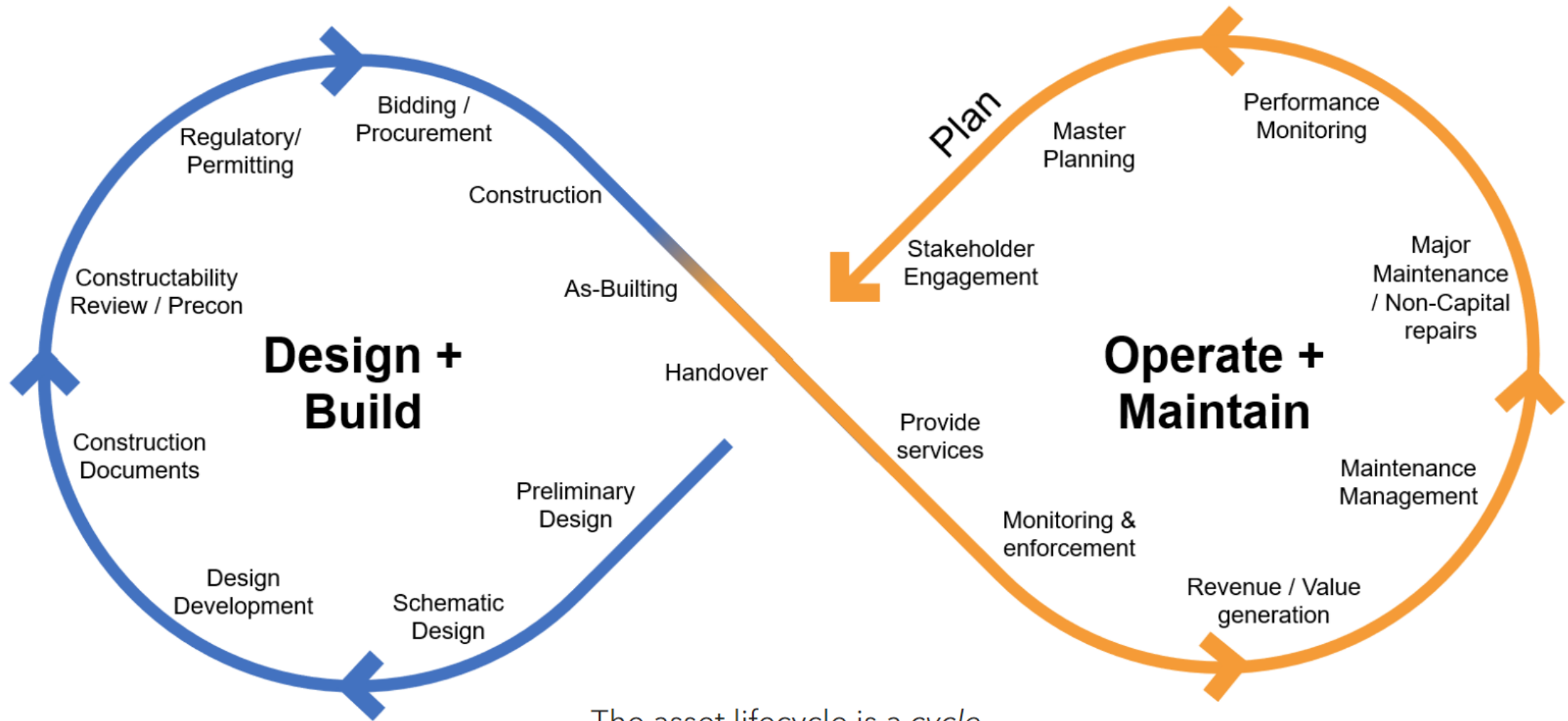
GWFF

GEOSPATIAL WORLD FORUM

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Geospatial Digital Twin from Design to Operation





An aerial view of a city with a dense forest of trees. A semi-transparent white box in the center contains the text 'Reality Mapping' and a paragraph. Several green 3D point cloud overlays are visible on the ground, with labels 'Laydown' and 'Hazard' pointing to specific areas. The scene is rendered in a high-resolution, detailed style.

Reality Mapping

Drones allow us to capture and monitor the world around us in high detail, creating things like [High-resolution Imagery](#), [Point Clouds](#) and [Meshes](#).

Laydown

Hazard

Laydown

Laydown

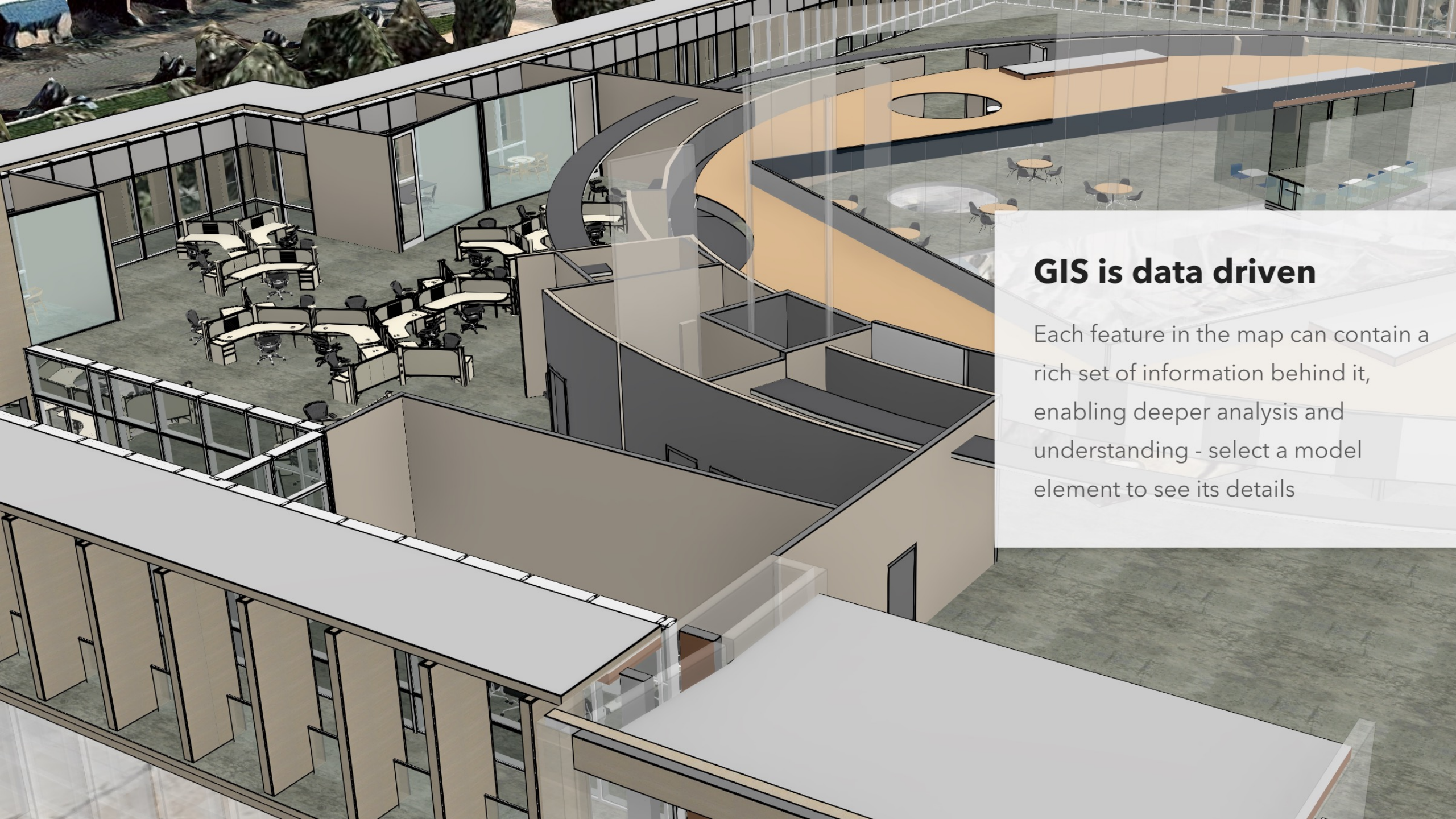
Laydown

An aerial photograph of a construction site. A semi-transparent white box is overlaid on the left side, containing text. A 3D BIM model of a building is overlaid on the right side of the image. The model shows a multi-story building with a curved section. The ground is mostly dirt and sand, with some green areas representing landscaping. There are trees and a road visible in the background. The text in the white box reads: "BIM data", "Integrate 3D Building Information Modeling (BIM) data to understand a design model in context". The word "Laydown" is written in white text on a green area in the foreground.

BIM data

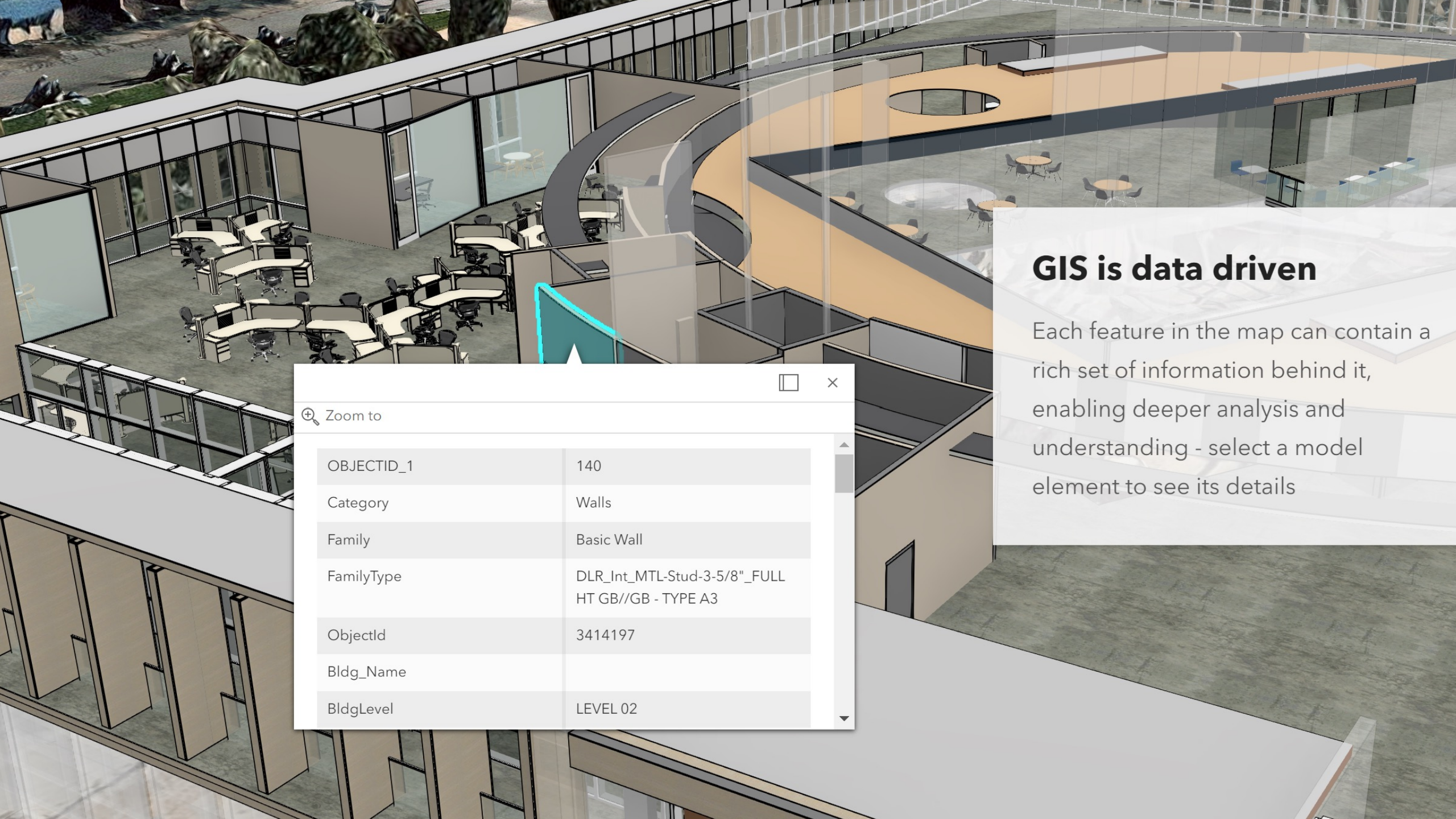
Integrate 3D Building Information Modeling (BIM) data to understand a design model in context

Laydown



GIS is data driven

Each feature in the map can contain a rich set of information behind it, enabling deeper analysis and understanding - select a model element to see its details



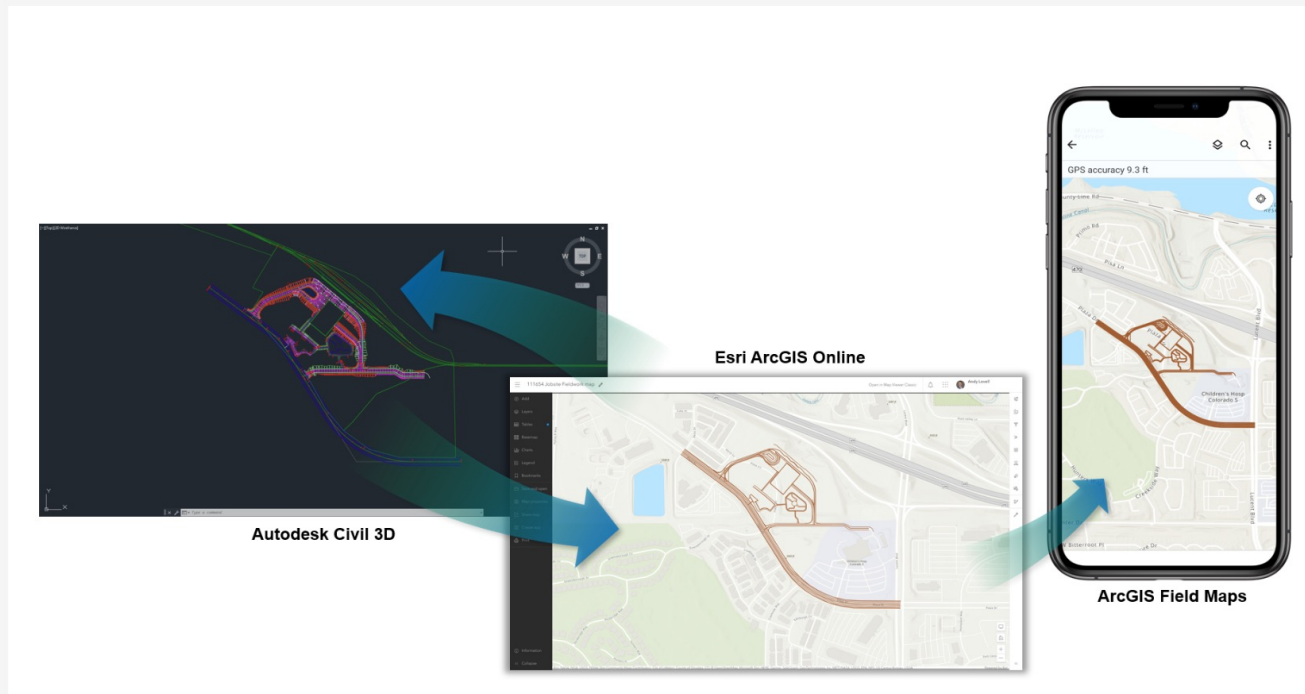
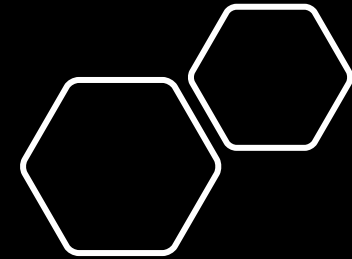
Zoom to	
OBJECTID_1	140
Category	Walls
Family	Basic Wall
FamilyType	DLR_Int_MTL-Stud-3-5/8"_FULL HT GB//GB - TYPE A3
ObjectId	3414197
Bldg_Name	
BldgLevel	LEVEL 02

GIS is data driven

Each feature in the map can contain a rich set of information behind it, enabling deeper analysis and understanding - select a model element to see its details

Connected Field Operations

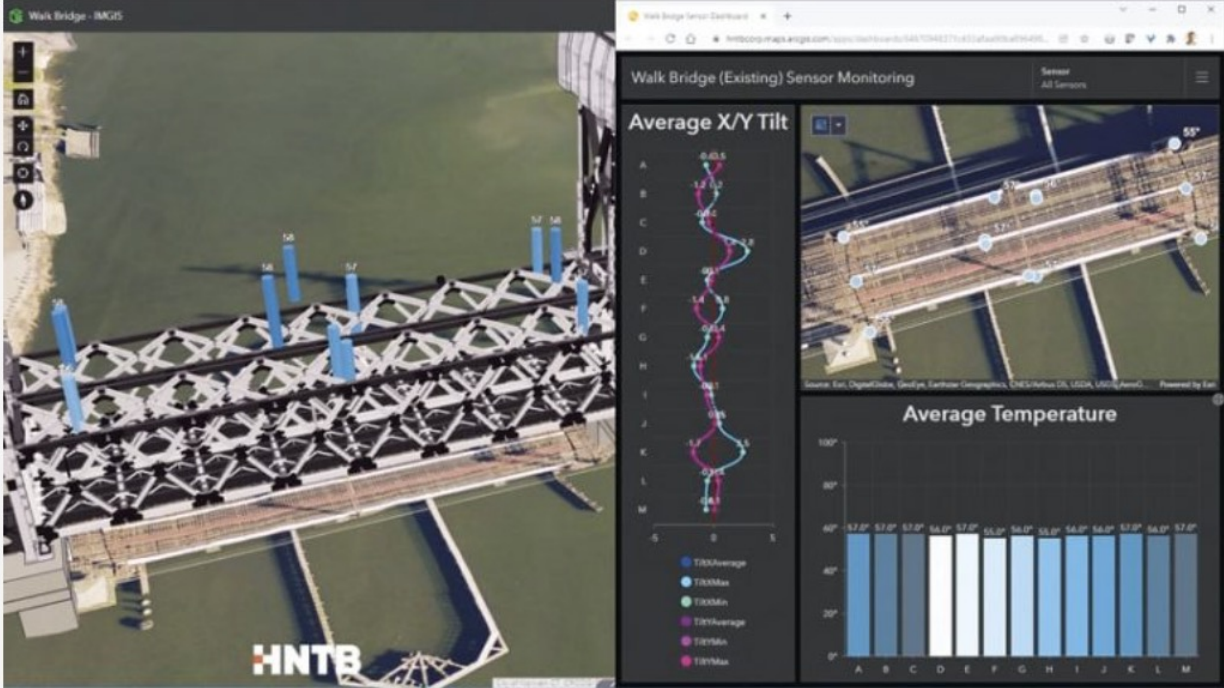
Mobile field data collection is a key element of GIS. Quality inspections, safety incidents, material deliveries, or daily progress reports can all be collected digitally using GIS-based mobile apps that enable a synchronized view of what's happening on site and standardize information for simpler, more accurate reporting.



Synchronize office and field teams with integrated CAD data and mobile apps for field operations

Bring in real-time data from sensors and connected equipment to enhance situational awareness

Connected equipment and Industrial Internet of Things (IIoT) sensors enable real-time insights into the construction site. Understanding when vibration or temperature levels reach critical thresholds or knowing the current location of equipment or personnel enhance situational awareness, safety, and quality.



HNTB employed real-time data from sensors to protect existing structures during construction, summarized in a Dashboard.

Incorporate drone data and 3D BIM models

In the initial planning stage, high-resolution aerial imagery captured by drones provides detailed and up-to-date visual information about the construction site.

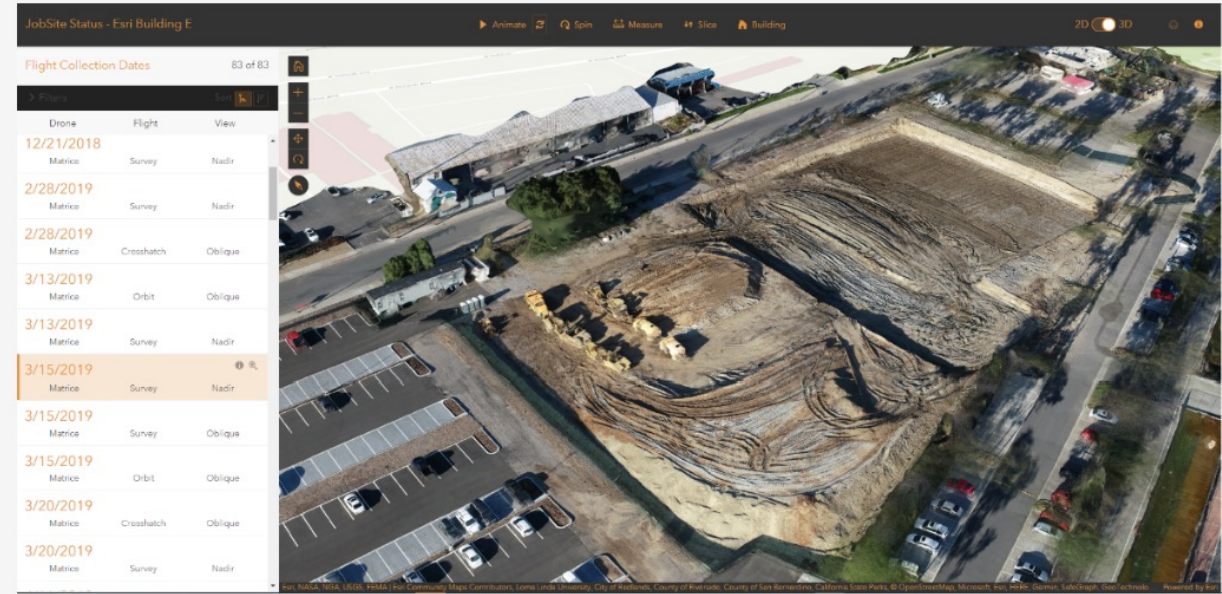
The screenshot displays a software interface for managing drone data. The top bar shows the title "JobSite Status - Esri Building E" and navigation tools like "Animate", "Spin", "Measure", "Slice", and "Building". A "2D/3D" toggle is visible on the right. On the left, a "Flight Collection Dates" table lists various drone flights with their dates, drone models, and camera types. The main area shows a 3D model of a construction site, overlaid on a map. The model includes buildings labeled "Building A" through "Building O", a "Library", "Esri Cafe", and "Esri Redlands". The map shows streets like "Metrolink", "W Redlands Blvd", "New York St", and "W Park Ave".

Flight Collection Dates	83 of 83		
Drone	Flight	View	
7/1/2018	Phantom	Crosshatch	Nadir
10/1/2018	Matrice	Survey	Nadir
10/30/2018	Matrice	Survey	Nadir
11/27/2018	Mavic	Survey	Nadir
12/21/2018	Matrice	Survey	Nadir
2/28/2019	Matrice	Survey	Nadir
2/28/2019	Matrice	Crosshatch	Oblique
3/13/2019	Matrice	Orbit	Oblique
3/13/2019	Matrice	Survey	Nadir
3/15/2019	Matrice	Survey	Nadir

Drone imagery can be used as a basemap for planning and design

Daily and weekly flights can provide stakeholders with access to current site conditions without ever having to make a site visit.

During the design and construction phases, drone imagery can be integrated into GIS to create accurate topographic maps, 3D models, and virtual flythroughs. This allows architects, engineers, project managers, and owners to visualize the project in a realistic manner and make informed decisions.



Drone imagery can be processed to create 3D reality models in geographic context

Bring all this data together in an immersive web experience to enable project stakeholders to track and manage construction activities, or even to calculate earthworks volumes.

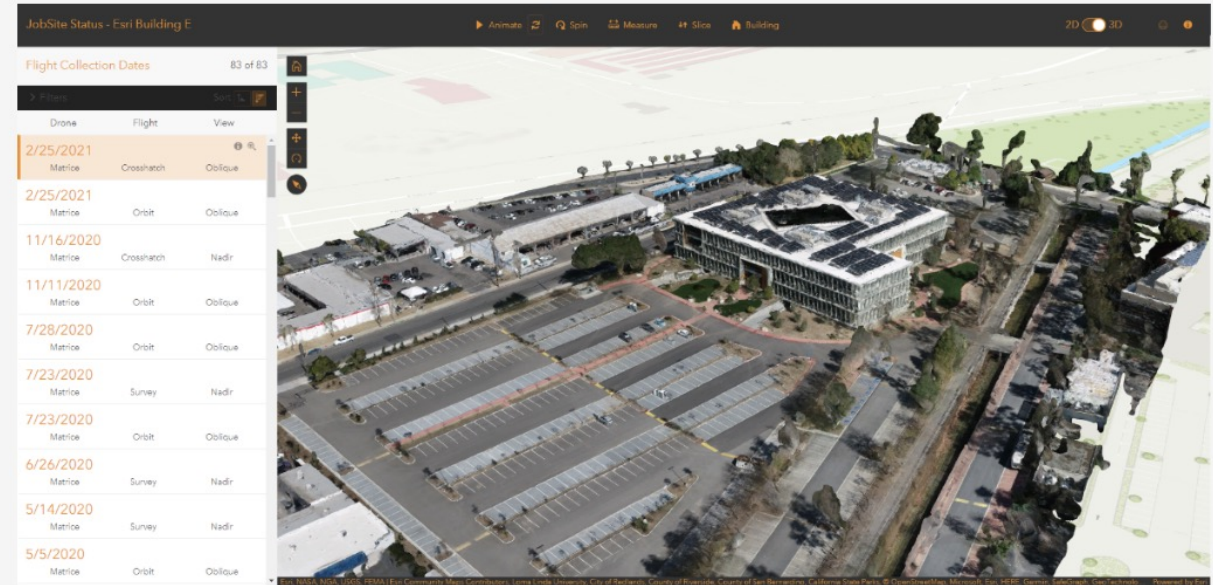
Bring in BIM models to compare design to reality. GIS has the ability to natively read Revit and IFC BIM models, and share them into lightweight web-friendly 3D scenes that can be accessed from any device.



3D BIM data can be integrated into the same scene

Overall, the integration of Reality Mapping and BIM with GIS empowers construction projects with improved planning, streamlined design, enhanced construction monitoring, and comprehensive documentation, leading to increased efficiency and cost savings.

Explore the Building E Job Site Status application and
[and this 3D web scene of the Snapdragon Stadium.](#)



Integrated 3D mesh of completed project

Game Engines for Site Validation & VDC





CERN European Laboratory for Particle Physics Asset
Management

GIS Interconnects & Integrates

Creating Relationships and Streamlining Workflows

Data Capture & Integration

Data Modeling
System Integration
Reality Capture
Information Management

Real Time & Visualize

Dashboards & Reporting
Real Time Analytics
Visualization

Analyze & Predict

Automation (AI/ML/DL)
Modeling
Simulation
Forecasting

Share & Collaborate

Engagement
Collaboration
Data Access
Information Sharing

GIS

Digital Twin

... Modeling the complete Lifecycle



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