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Implementing an Operational Digital Twin at a Major International Airport

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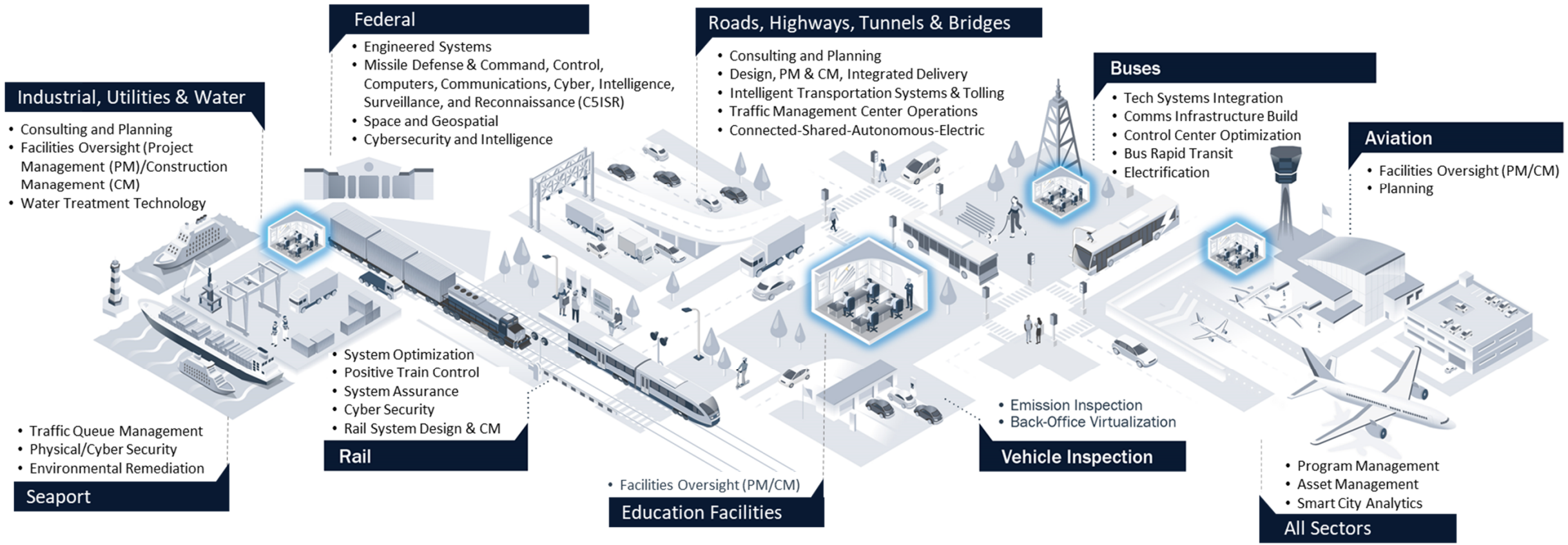
About Parsons and Parsons X



Parsons X provides digitally enabled solutions and services for Aviation, Transportation, Rail, Ports, Utilities, US Federal Agencies, the Department of Defense, and municipalities worldwide. We help foster the digital transformation of critical infrastructure by delivering GIS Systems, Program Management Information Systems, Enterprise Asset Management Systems, and Smart City Analytics.

Digital Business Drivers and Digital Twin Concepts

Implement a digital twin to provide end-to-end visibility of assets during their entire life cycle through a **single pane of glass.**

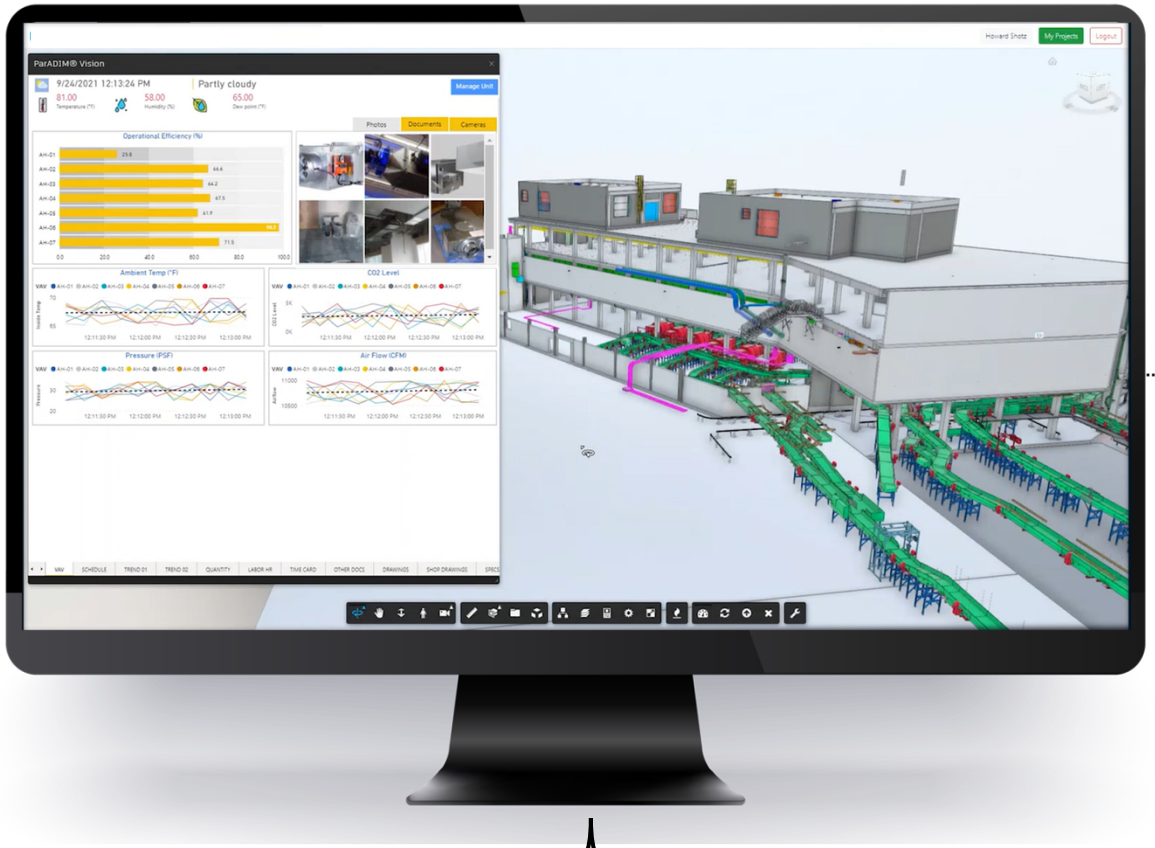
Increases efficiency, performance and availability of the assets.

- Create a digital strategy and governance plan for future construction projects using the digital twin
- Increase efficiency and advance sustainability by creating a digitized infrastructure with Internet of Things (IoT), allowing the assessment and visualization of the operational health of the infrastructure
- Improve communication, awareness, and coordination through immersive visualization with federated access to large amounts of otherwise siloed data
- Improve decision making through analytics and simulations
- Real-time and predictive alerts where various conditions of assets are tracked, and responsible parties are notified before, or as soon as maintenance or emergency situations arise

Airport Project Overview

- Focus on asset management, energy efficiency, and situational awareness
- Implement a Digital Infrastructure Platform (DIP) solution based on a commercial off-the-shelf product
- Twin a newly rehabilitated runway
- Twin the Central Utility Plant (CUP)
- Twin a recently expanded terminal
- Integrate with the building automation systems, enterprise asset management systems, and sensors
- Work with the National Renewable Energy Lab on a predictive energy model
- Optimize the cost of airport modernization

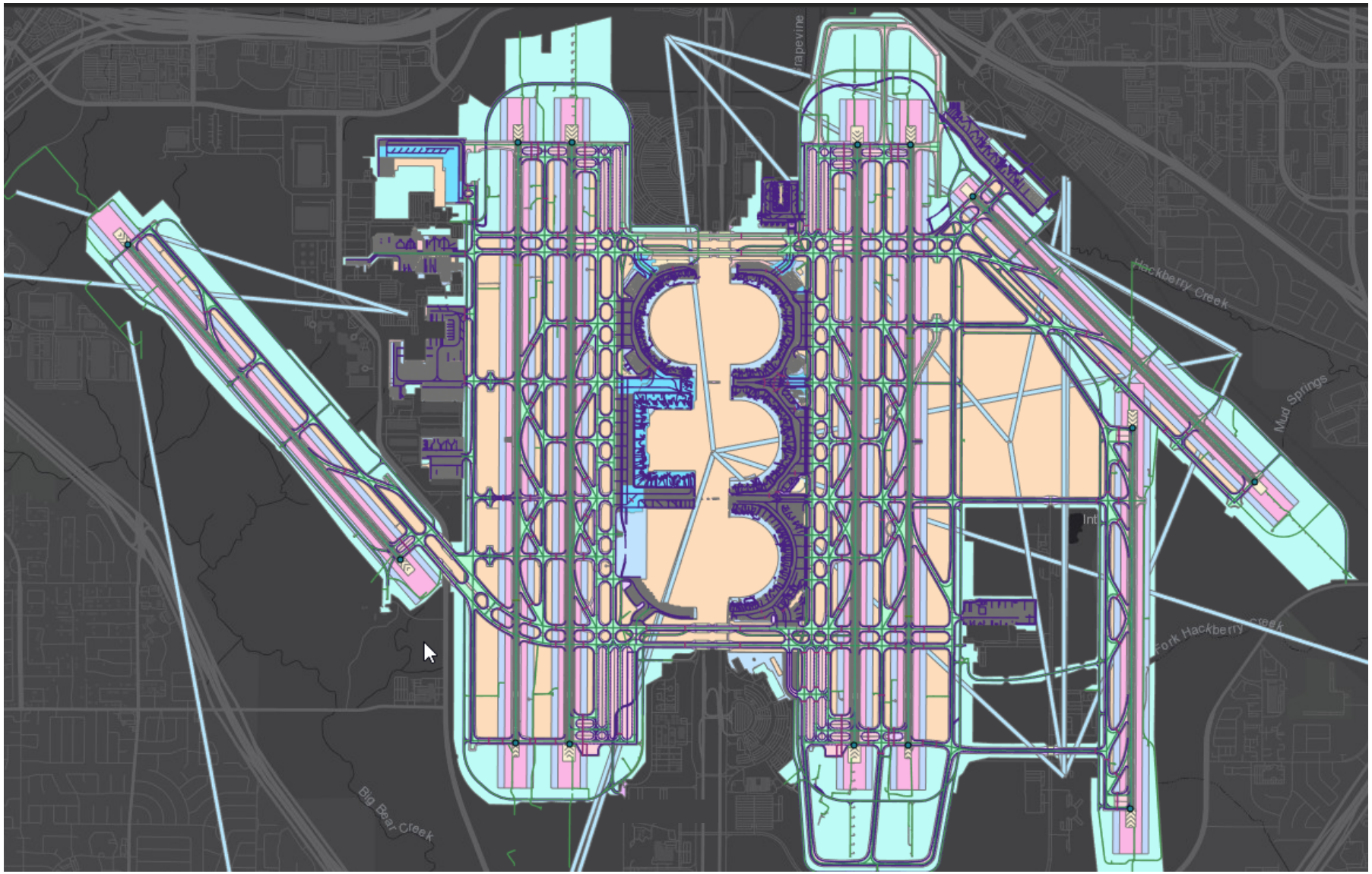
Operational Digital Twin



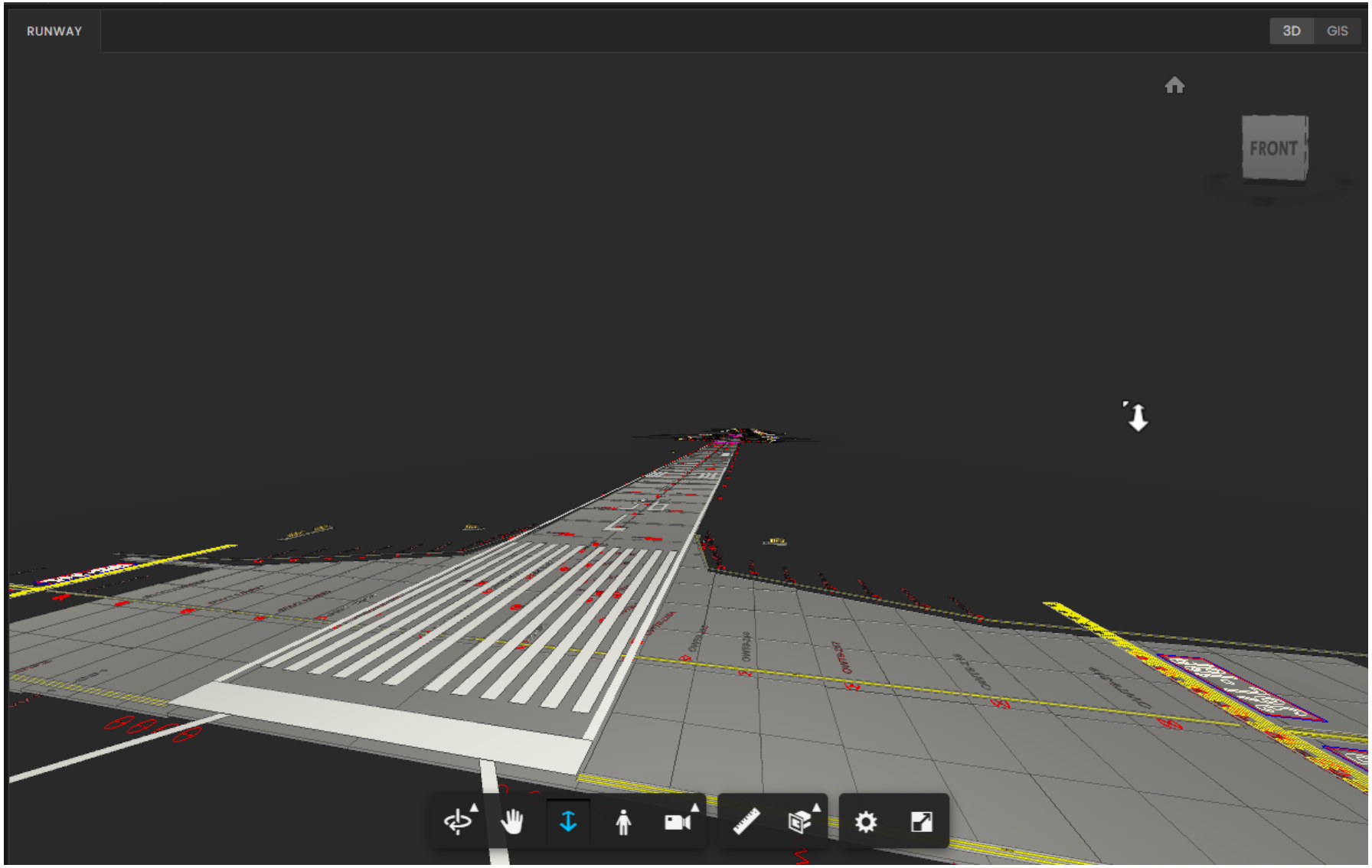
- Provides visibility into all historical and current aspects of the airport's assets to better manage and improve operations
- Seamlessly builds upon the current asset knowledge base across various asset phases and sources
- Provides a single, integrated solution that can be used for all phases of the asset's lifecycle by all stakeholders
- Improves management of the airport facilities to increase operational performance, efficiency, and availability of the assets

Runway - AutoCAD Civil 3D CAD	ESRI GIS Site Content	Veoci EAM Part 139 Work Orders	Lufft ViewMondo Runway Sensors	INFOR EAM Work Orders	Terminal - Revit 3D BIM	Johnson Controls Building Mg System (BMS)	WebTMA

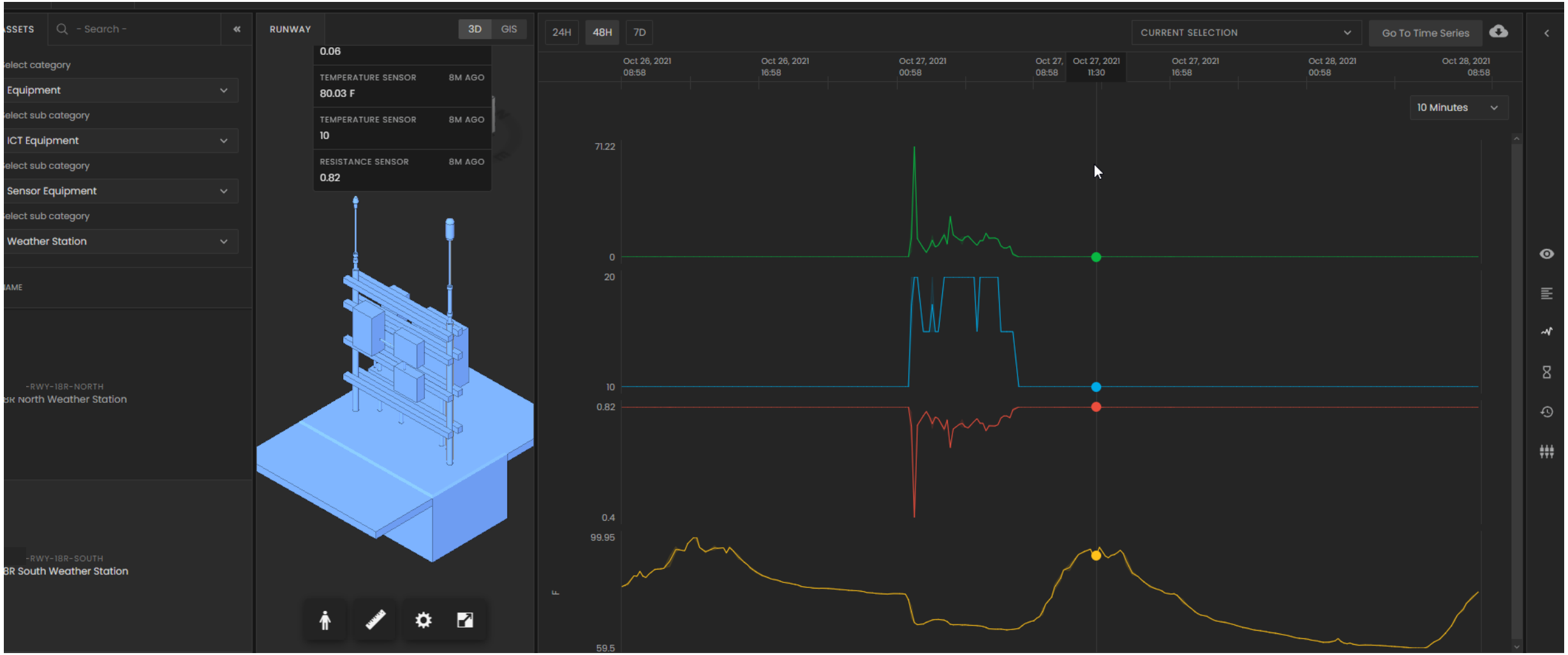
GIS Integration Map



Runway Paving, Markings, Lights, and Signs

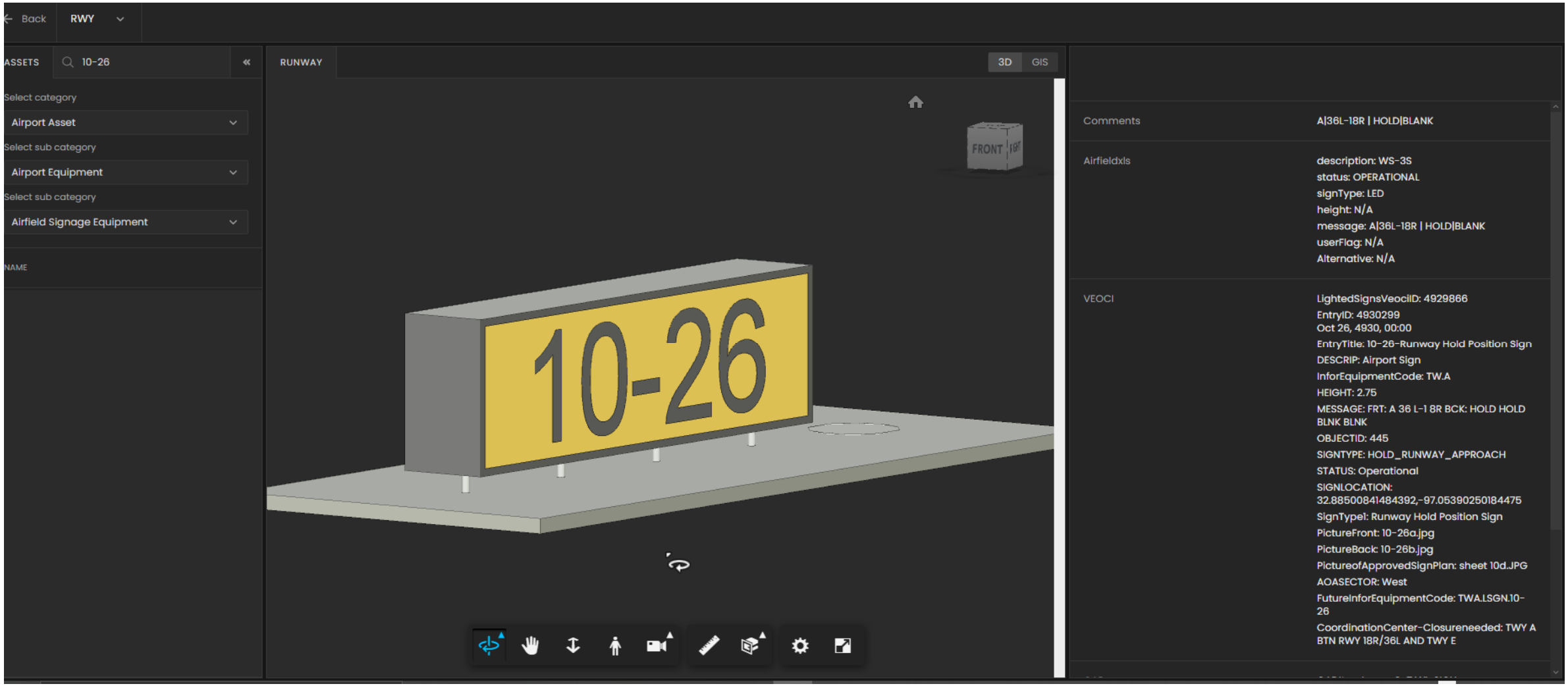


Runway Weather Station Live IOT Integration

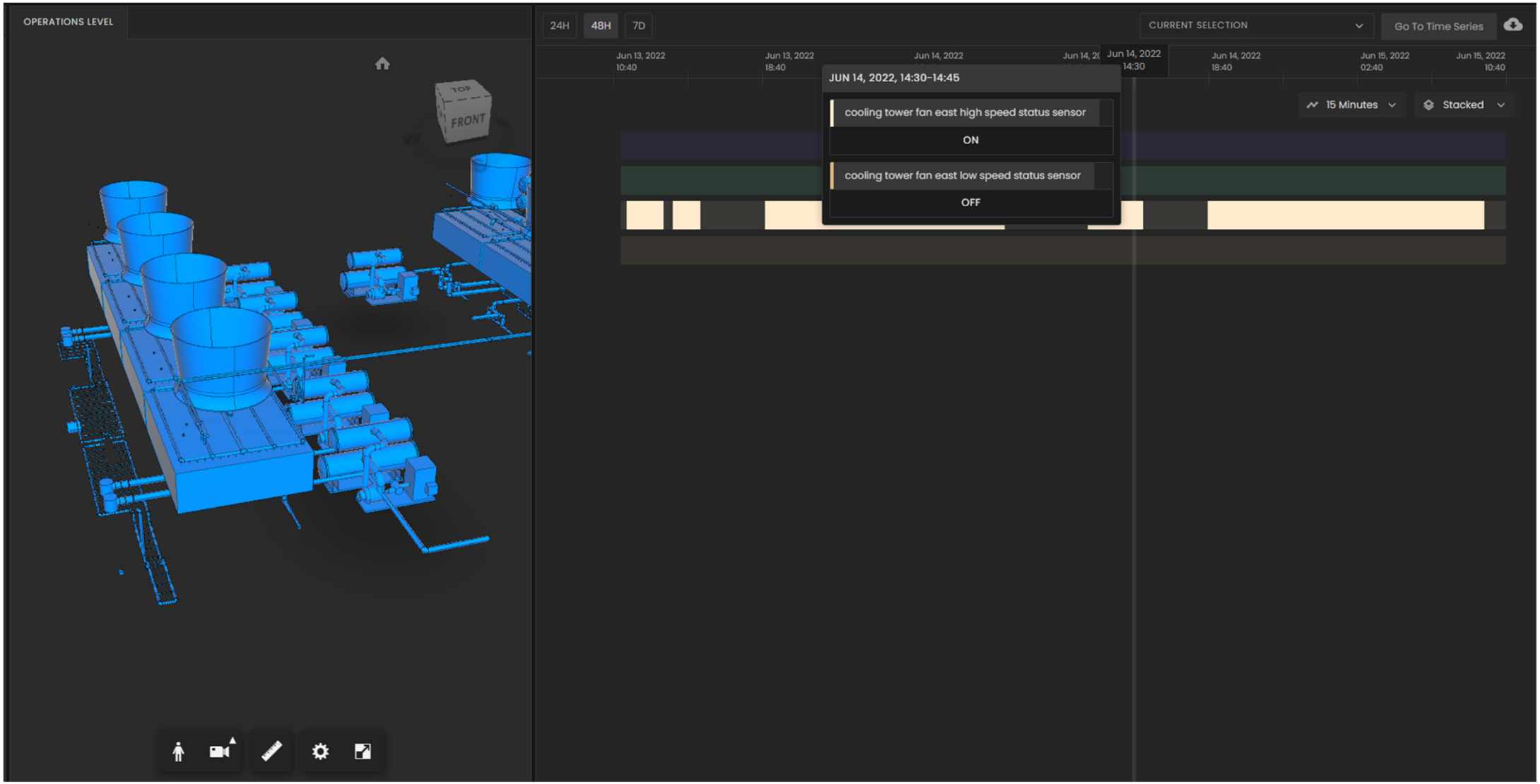


Runway Weather Station Time Series Live Data

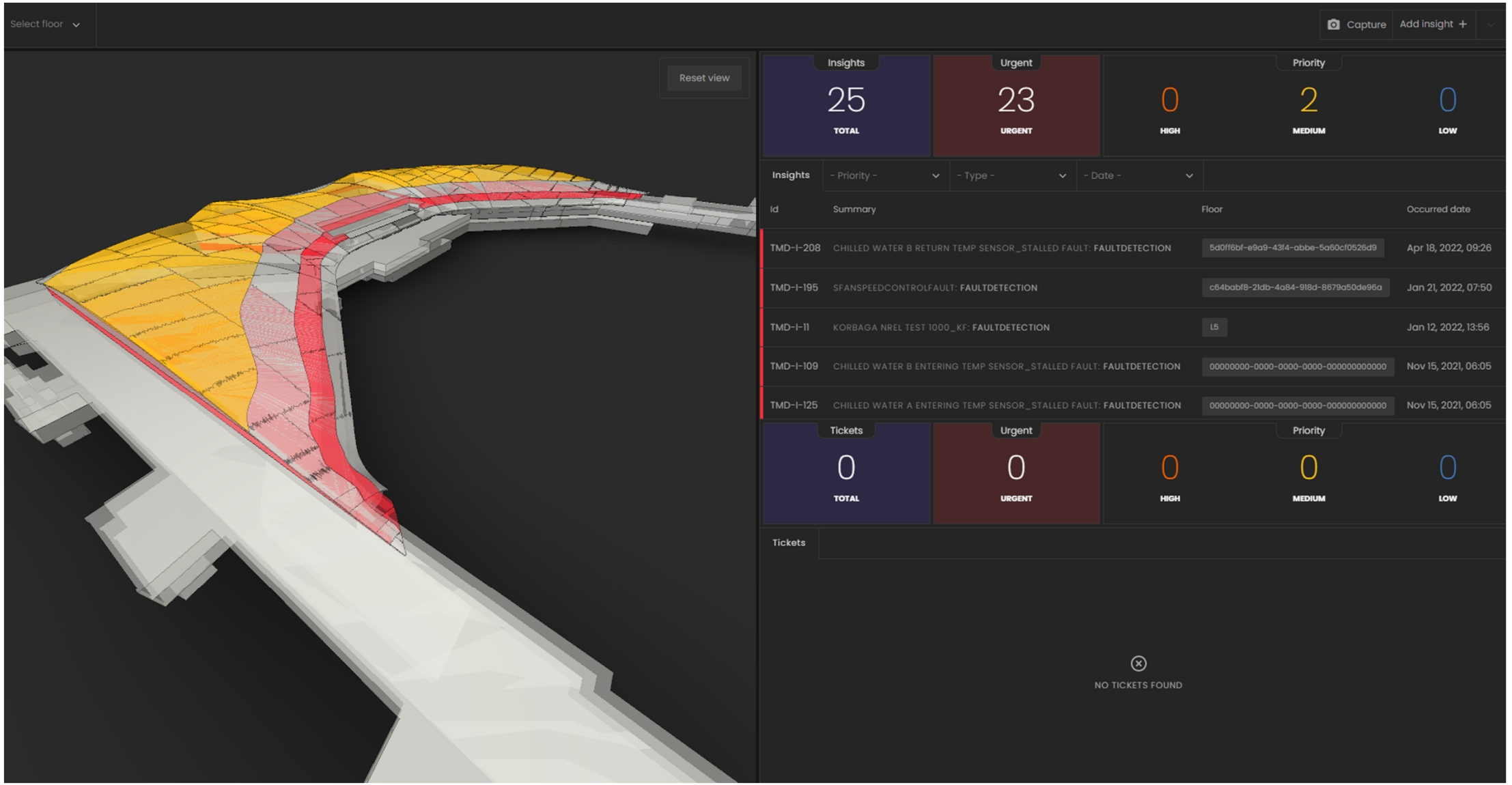
Runway Signs with Multiple Source Systems Integration



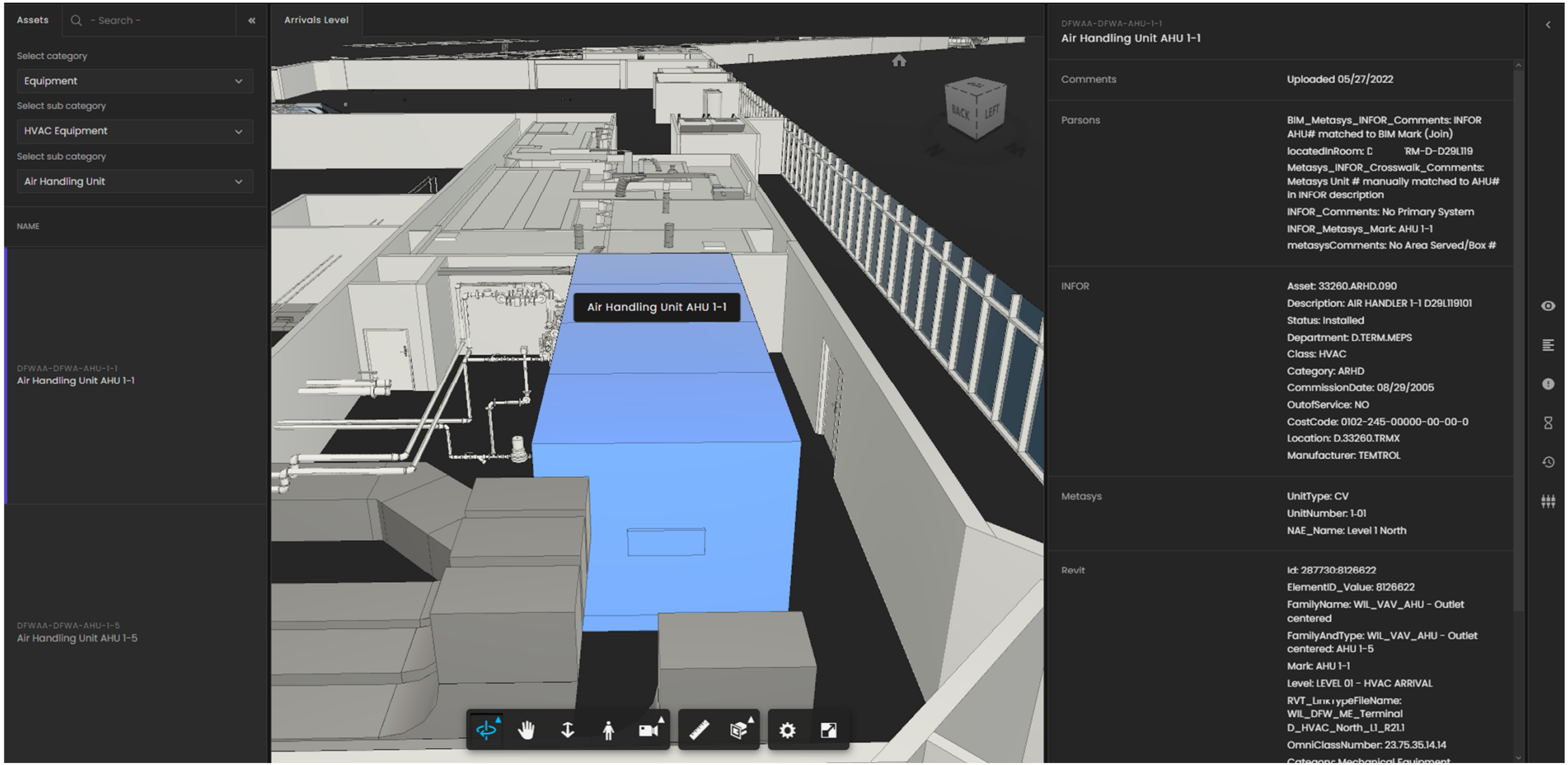
Central Utility Plant with Operational Sensor Integration



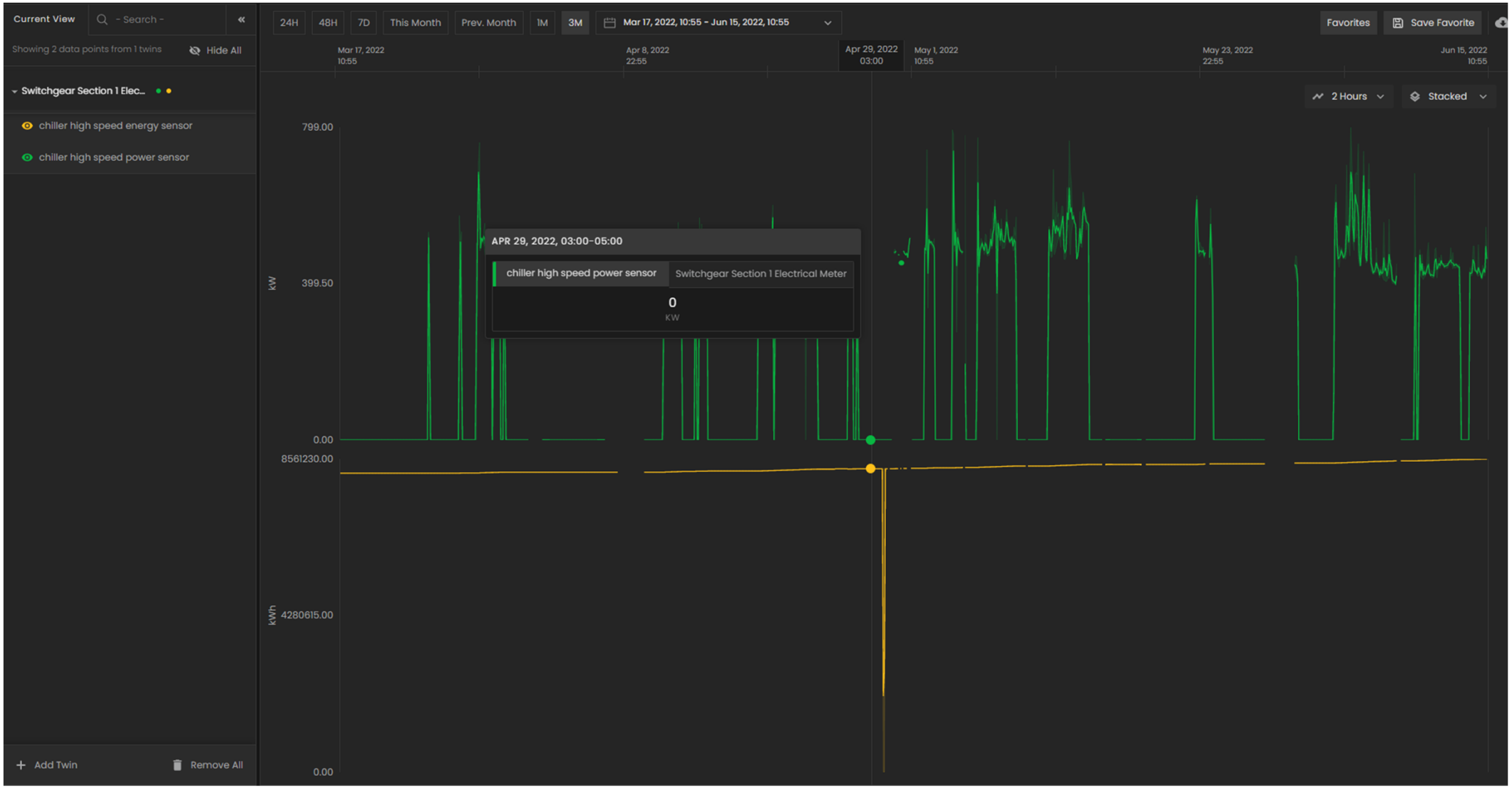
Terminal Linked to BMS and EAM System Data & Sensors



Terminal Asset Linked to Multiple Source Systems

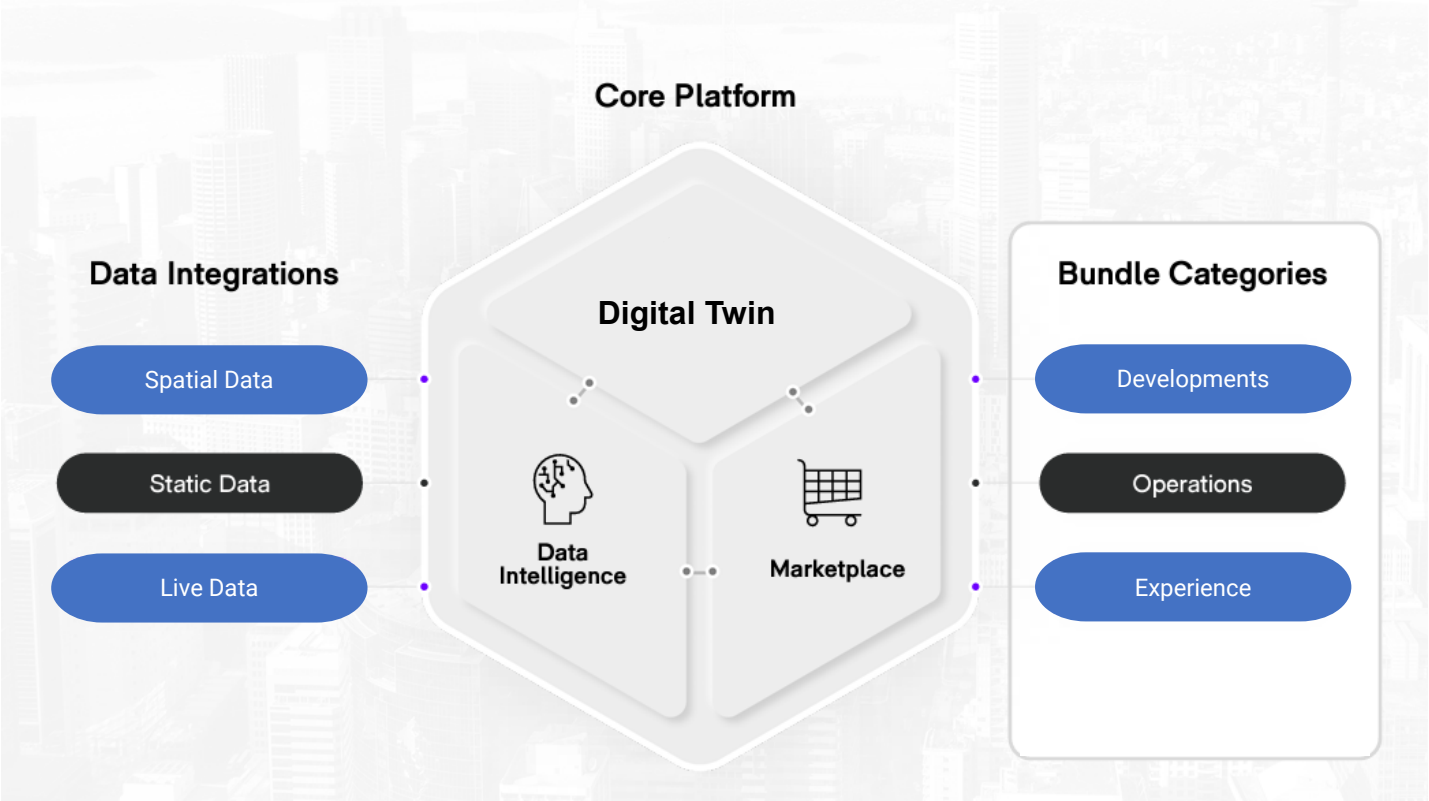


Time Series Analytics from Sensor Data



Implementation and Integration Overview

- Define Digital Governance Standards
- Provide a cloud-based DT platform
- Link GIS services, CAD & BIM models to the platform
- Develop live integrations with legacy systems
  - Enterprise asset management and maintenance ticketing
  - Building management systems
  - Runway inspection database
  - GIS mapping
  - Sensor data



Example non-specific, non-exhaustive solution summary

Implementation and Integration Process

1. Asset Data

Identify the assets and compare tabular asset data from the airport to the spatial assets identified

Upload relevant assets into the DT

2. Spatial Data

Upload spatial information to the DT and link asset data to the spatial data via graphical user IDs (GUIDs)

Users can see the asset data associated with model elements

3. Pre-Integration

Review airport documentation

Establish an integration strategy

4. Integration & Data Acquisition

Configure software connectors to identified systems

Scan live data

Map systems and configure rules engines

5. Data Sharing & Applications

Third party integrations configuration of the Building Dashboard

Implementation of the Rules Engine

6. Training

Provide training for airport users intended to interact with the platform

Implementation Activities

- Review existing airport digital strategy and governance documentation
  - Enhance strategy to help use digital data provided by design, construction, and commissioning teams on future capital projects
- BIM Interoperability and Dynamo Model Checking
- Comply with the airport’s Information Security procedures
- Install platform and configure
- Provide the airport team with in-depth training of the platform and ensure access to the resources required to keep training current and up to date

Lessons Learned

- 3D is expensive
- Define realistic expectations. This is a marathon, not a sprint.
- Beware of legacy building/process control systems
- Fund through Capital Construction Program
- Implement an Integration Platform
- Sensors need connectivity
- Data Quality is important
- Data Governance is important

Thank you!

Questions?

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Roadmap

- Align the user experience with personas and workflows
- Add runways and terminals to platform incrementally over next 5 years
- Integrate with the Central Utility Plant (CUP)
- Implement bi-directional integration to work order systems
- Develop enhanced data analysis and strategic reporting
- Further define the roadmap
- Define additional high-value use cases
- Develop a staffing plan
- Define better ROI