

# Realizing Digital Twins



**AUTODESK Tandem**  
Modernize your operations

Robert Bray  
Vice President & General Manager,  
Autodesk Tandem™



# Agenda

- **Digital Twin**  
Opportunities and Challenges
- **Realizing Digital Twins**  
Autodesk Tandem
- **Case Studies**  
Ready for Tomorrow, Today

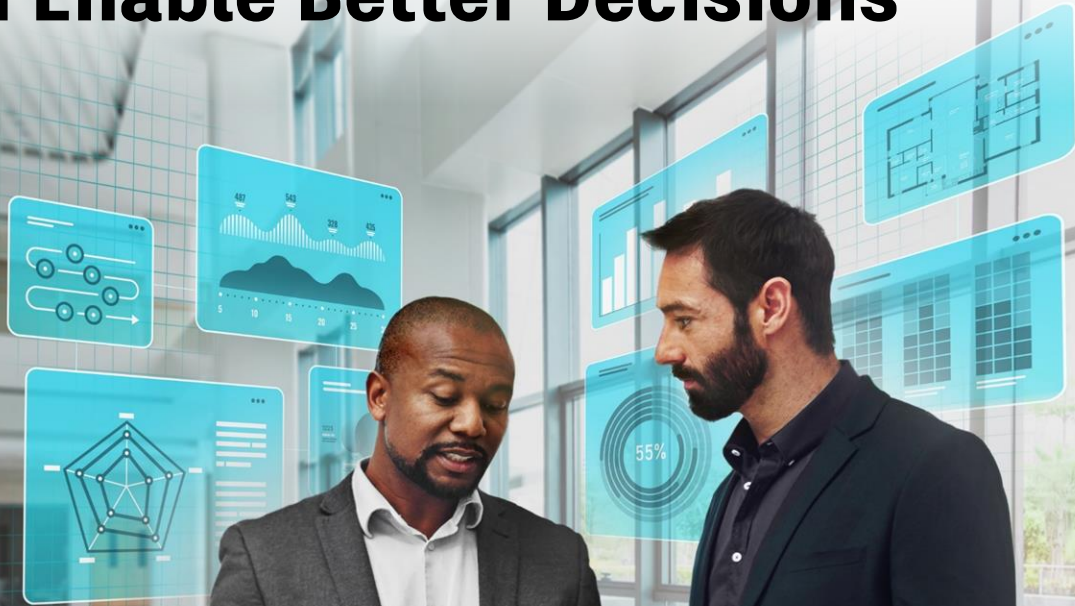


# Digital Twin

Opportunities and Challenges



# Data Can Enable Better Decisions



# We Operate in the Dark

**85%** of operators struggle with poor and fragmented data

Poor and fragmented data contributes to ineffective decision-making and inefficient operational processes

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**60%** of space is underutilized due to poor real-estate decisions and new workplace trends

**50%** of maintenance inefficiency is due to poor workflow management

**30%** of energy wasted is due to ineffective asset operation

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Data from IFMA + ARC Research Report

<https://damassets.autodesk.net/content/dam/autodesk/www/pdfs/Autodesk-IFMA-Research-Report-Optimizing-Building-Management-Lifecycle-Approach.pdf>

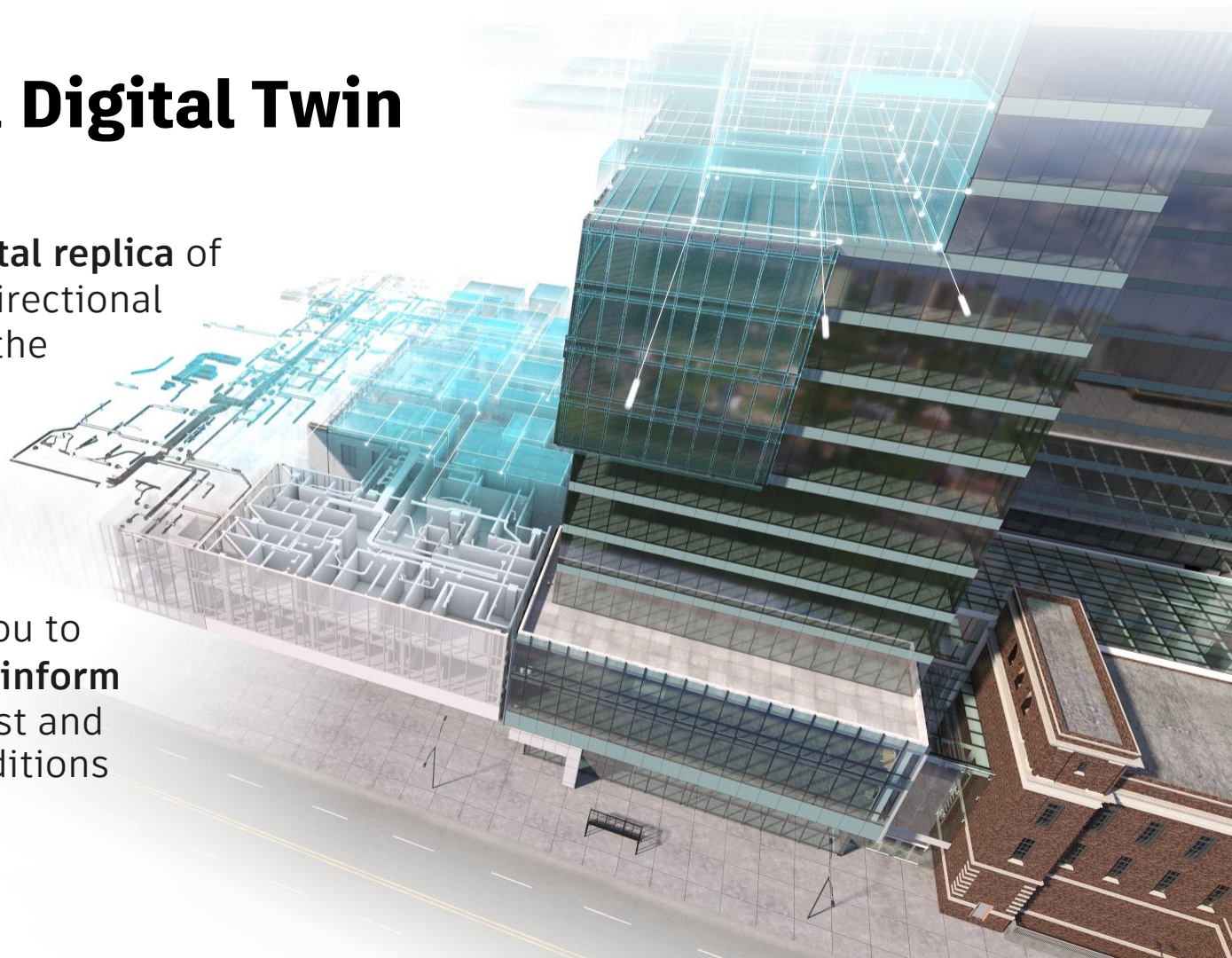




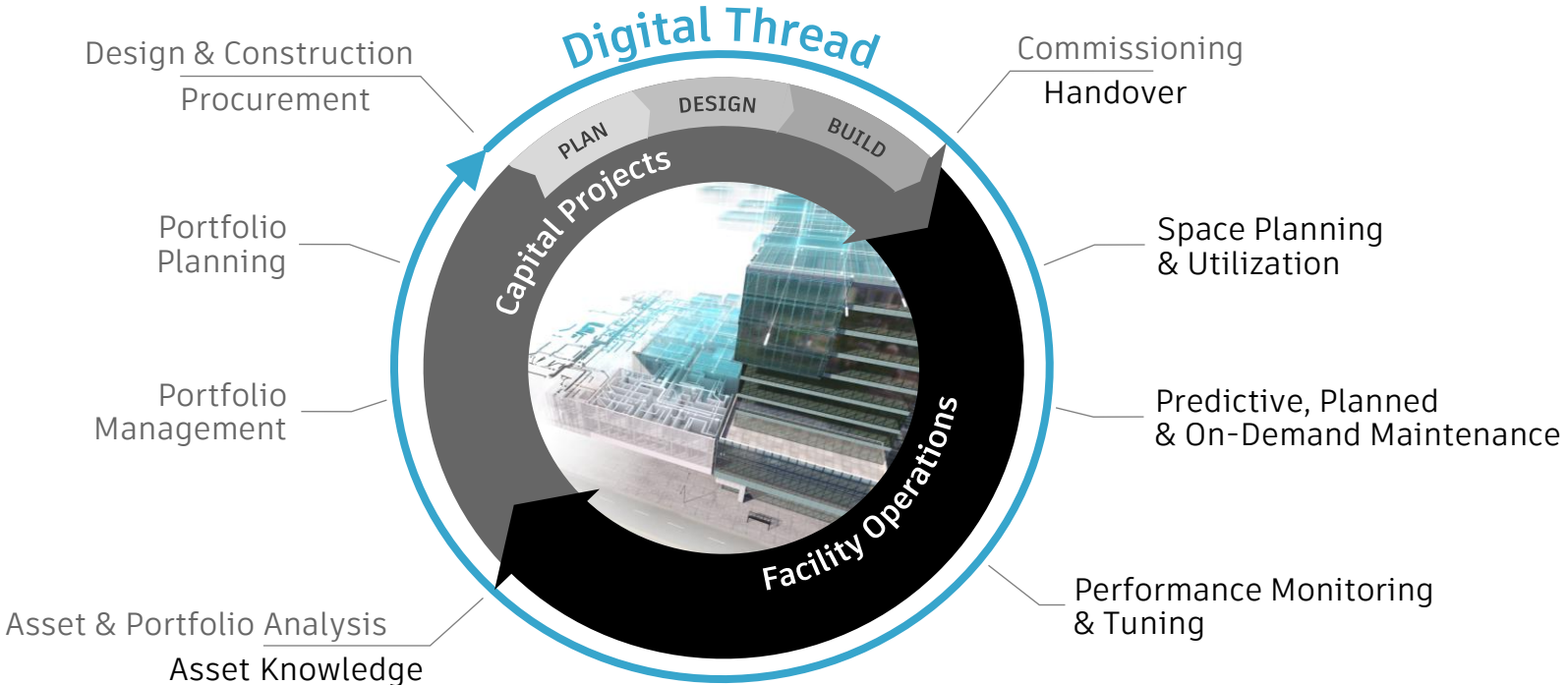
# Promise of a Digital Twin

A Digital Twin is a **digital replica** of a built-asset with **bi-directional connections** between the **physical** and **digital**

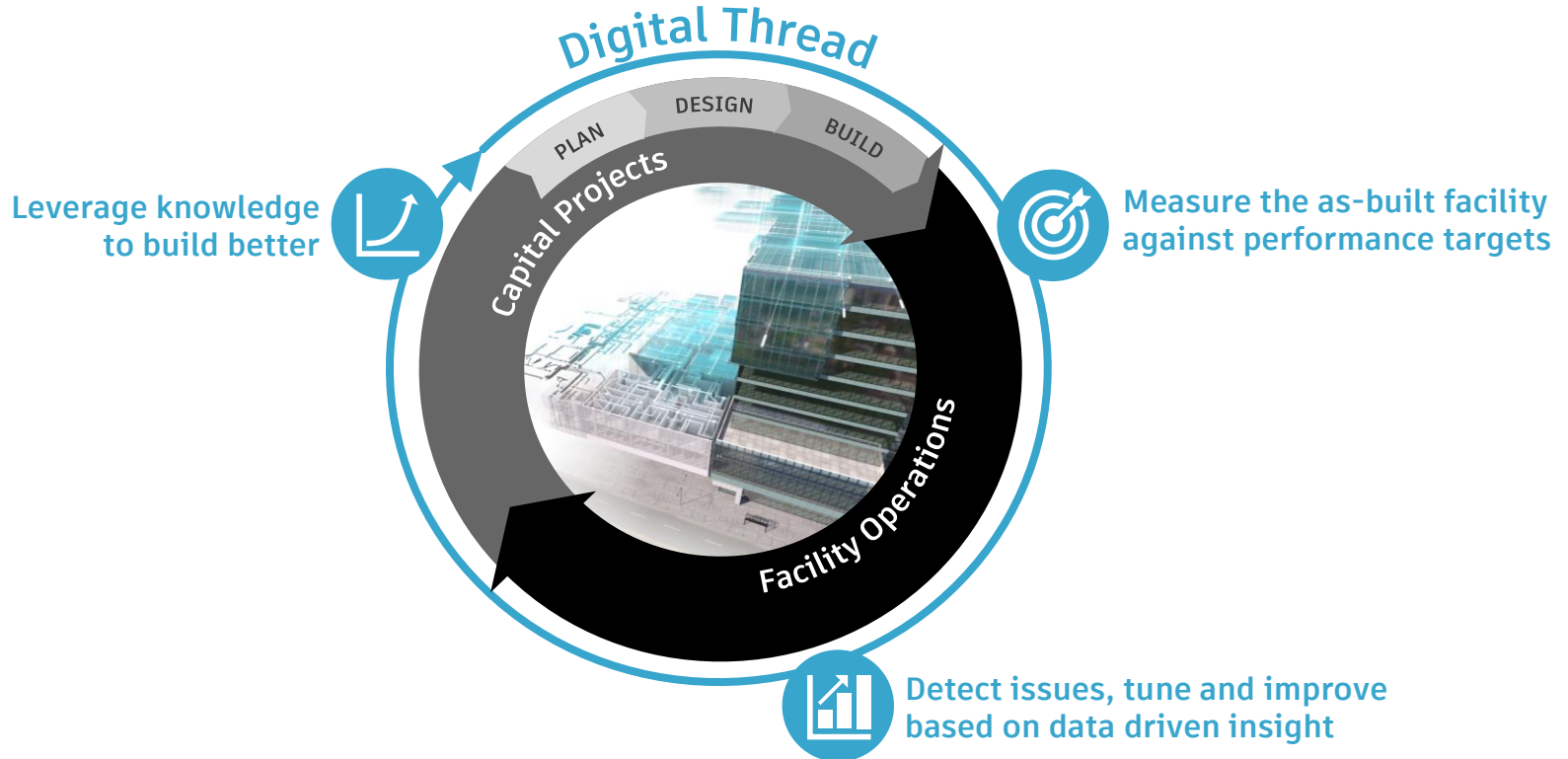
Digital Twins enable you to **predict, simulate, and inform decisions** based on past and current operating conditions



# Transformative Potential



# Built Asset Lifecycle Benefits

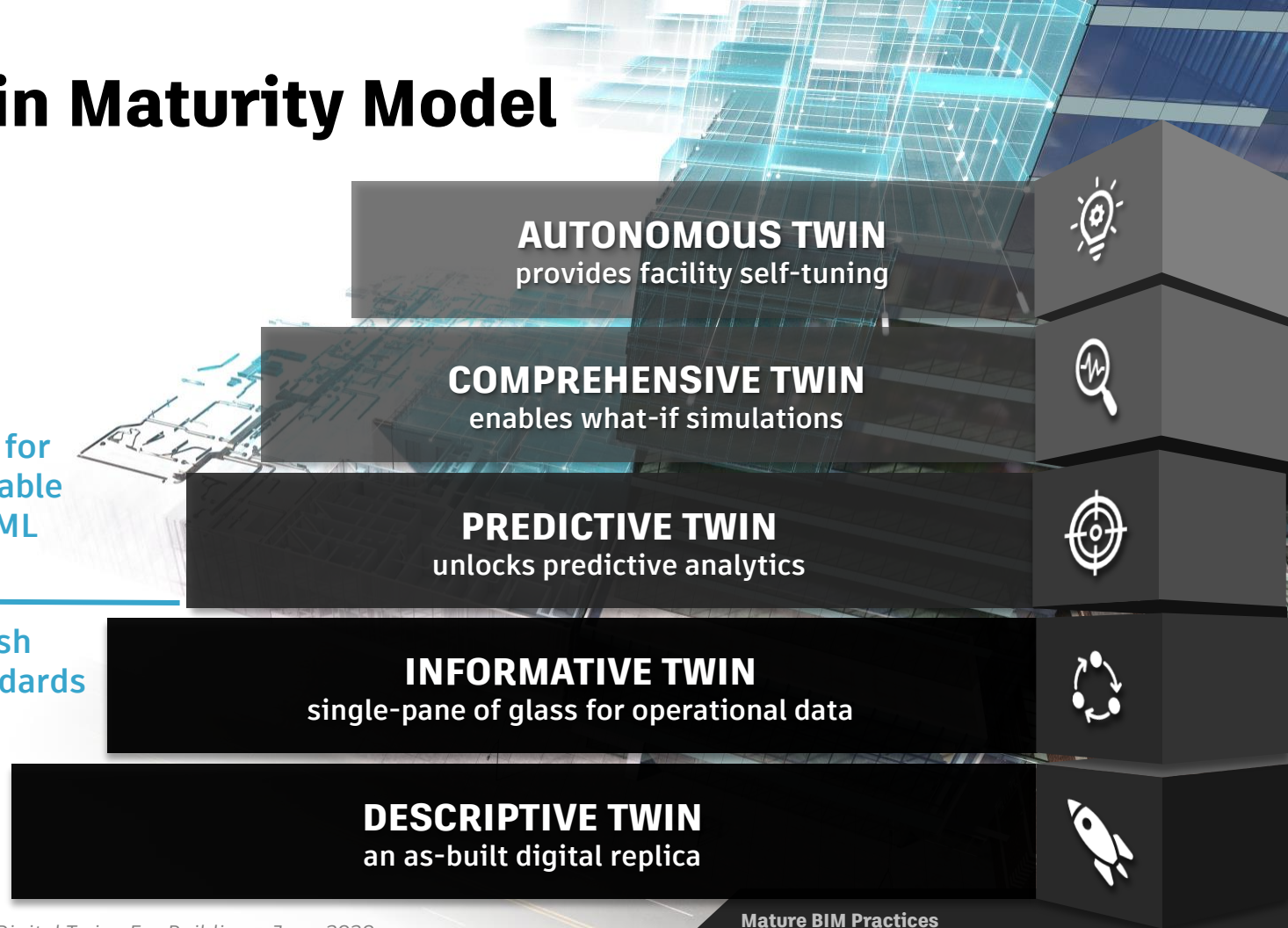




# Digital Twin Maturity Model

To have a foundation for portfolio wide actionable insight driven by AI/ML in the later stages

It's critical to establish normalized data standards in the early stages



# Why are Digital Twins so Hard?



Lack of standardization  
and interoperability



Poor data quality  
and management



High cost and complexity  
of customization

# How we are Overcoming these Barriers



MAKE IT  
REPEATABLE

Lack of standardization  
and interoperability



MAKE IT  
VISUAL

Poor data quality  
and management



MAKE IT  
SIMPLE

High cost and complexity  
of customization



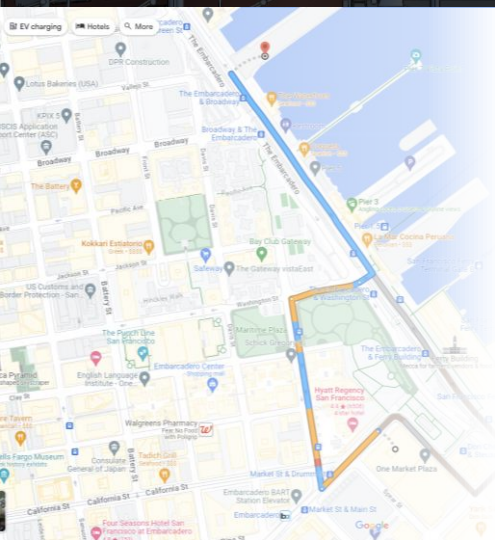


# Realizing Digital Twins

with Autodesk Tandem



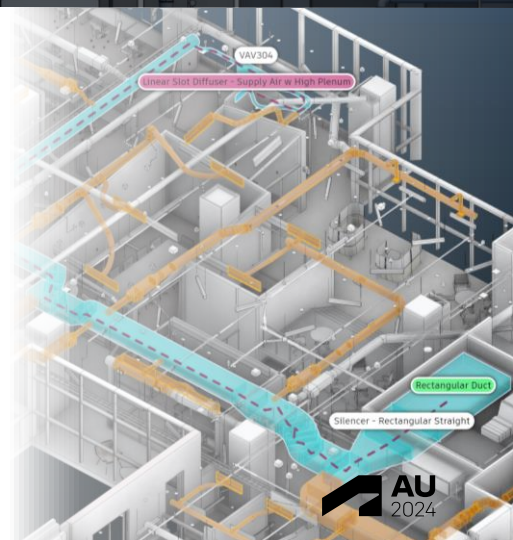
# Autodesk Tandem empowers operators to understand and optimize their built environment



*What Google Maps did for consumers*

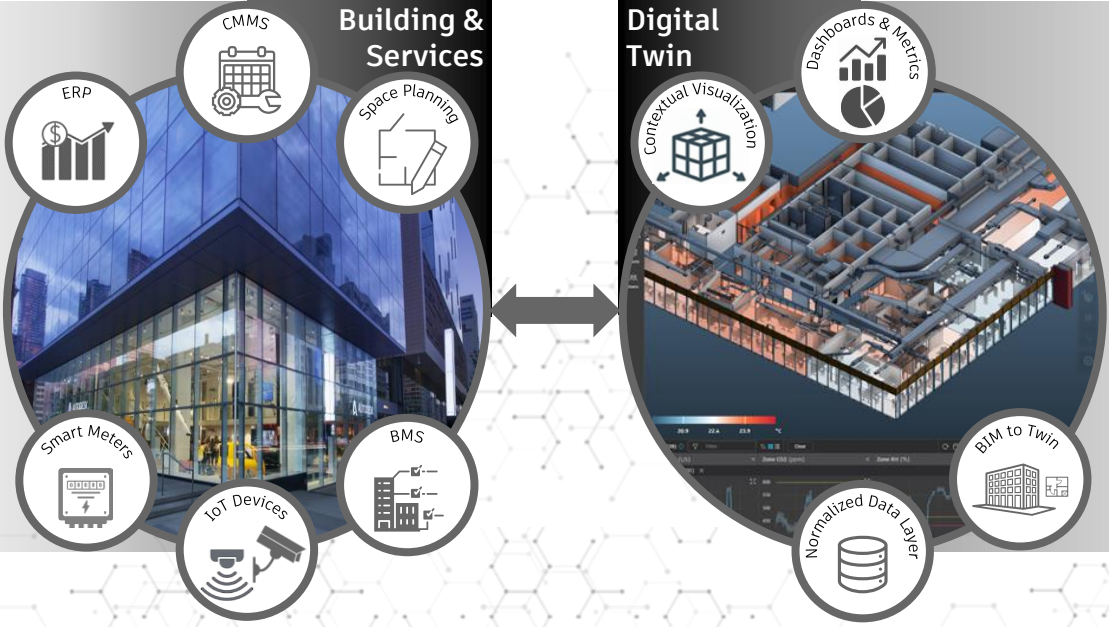


*Autodesk Tandem will do for operators*



# Autodesk Tandem

Modernize your operations



- ✓ Enables accurate asset, space, and system data
- ✓ Provides a single pane of glass by connecting data from IoT, enterprise, and control systems
- ✓ Delivers actionable insight to make proactive, informed decisions

## Outcomes

Improve Efficiency

Reduce Utility Costs

Achieve Net Zero

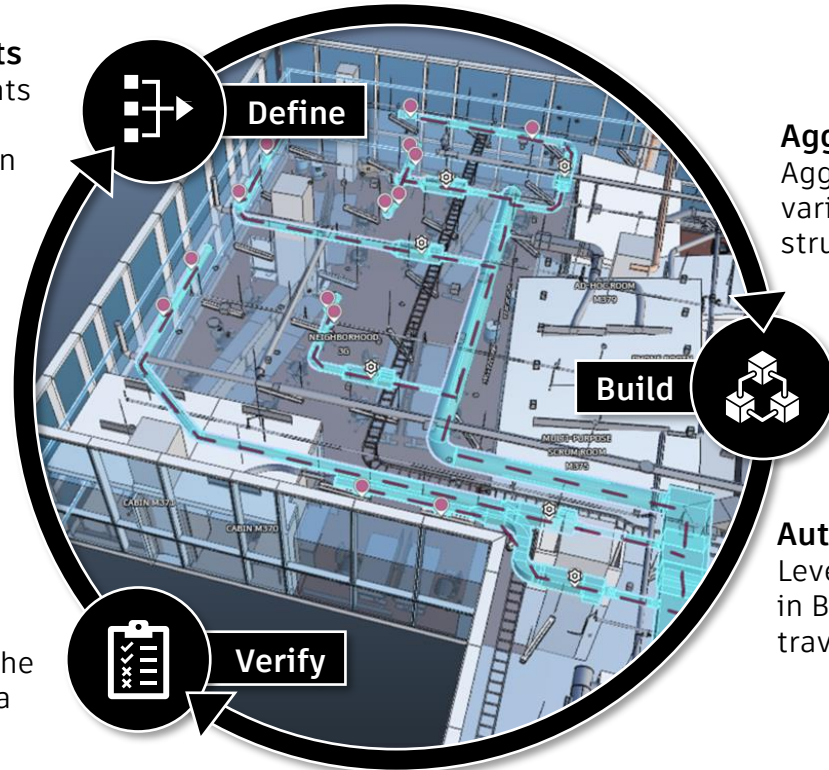
# Harnessing BIM to Realize Digital Twins

## Asset Information Requirements

Define the information requirements for the management of assets throughout their lifecycle, based on operational objectives

## Ensure Data Accuracy

Track progress and validate the completeness of as-built data



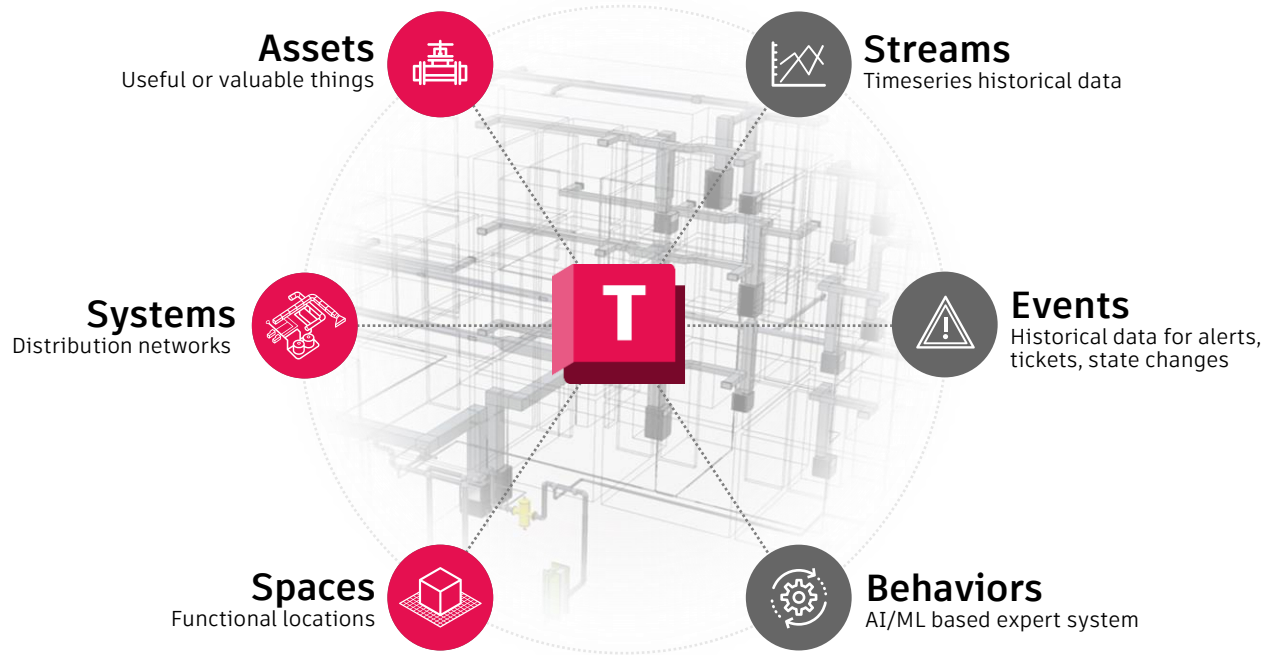
## Aggregate & Normalize Data

Aggregate, map and organize data from various sources into a single unified structure making it actionable

## Automate Ontology Development

Leverage spatial and data relationships in BIM to create an efficient and traversable digital graph

# Digital Twin Anatomy





# Realizing Descriptive Twins

ADS K BHAM Facility

Search ADSK BHAM Facility

Shop Floor

Monday, October 7, 2024 10:39 PM GMT+1

Filters

Assets

Files

Docs

Systems

Connections

Specs

Streams

History

Inventory

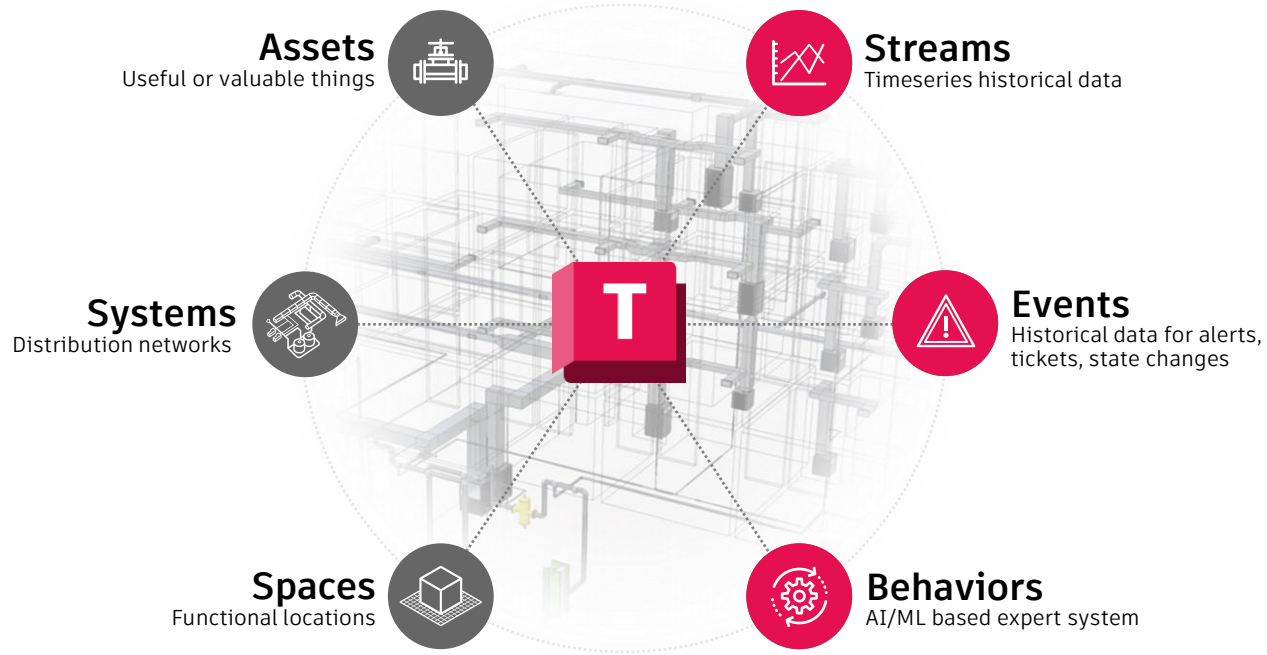
Ab

Mazak I300

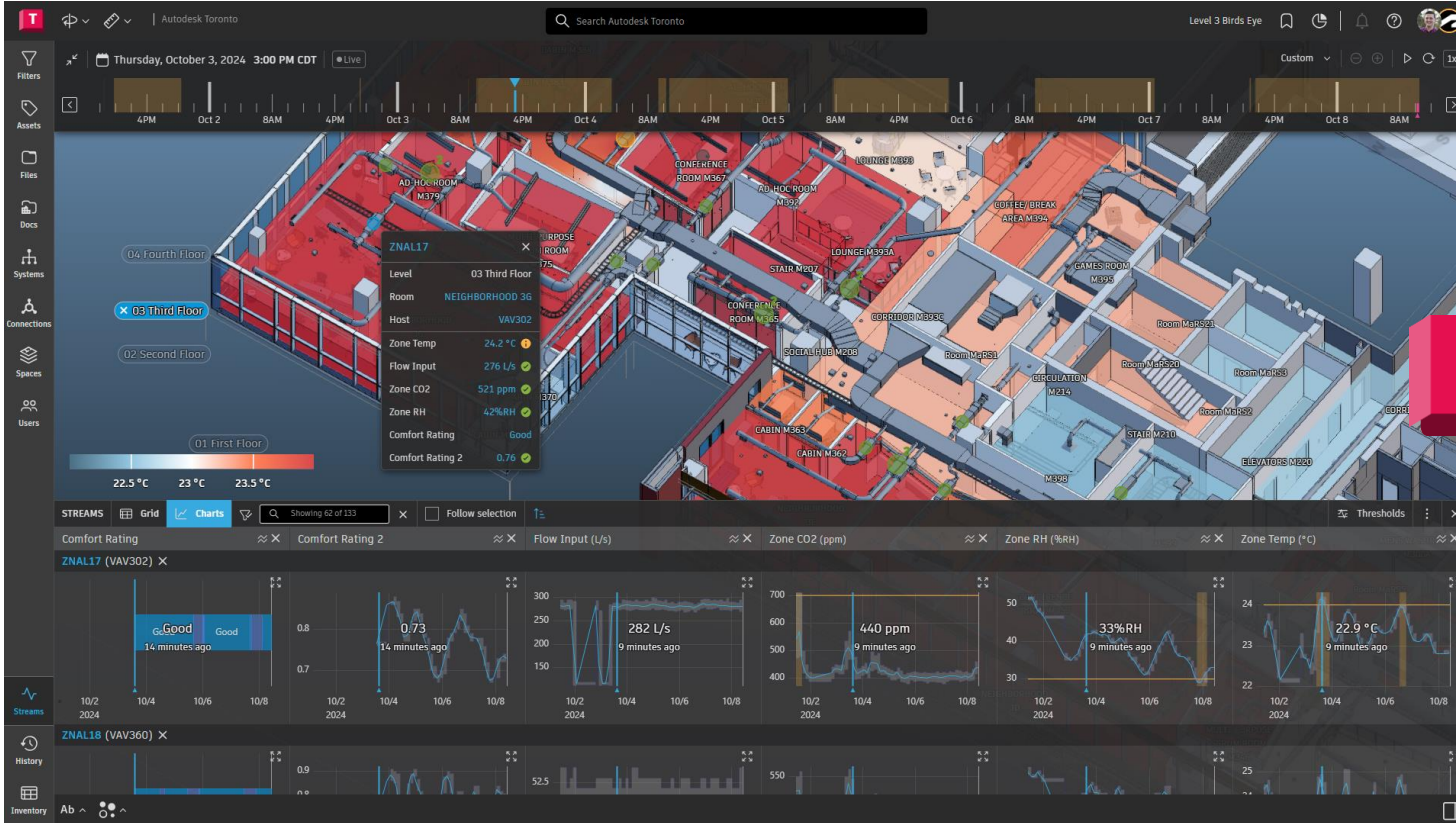
Level	Level GF
Room	Tech Centre
Asset Tag	ATD01017
Controller	Mazatrol Smooth X
Machining Type	Turn-Mill
Manufacturer	Mazak
Model	Integrex i300s
Run Status	0
Main Spindle Speed	0 RPM
Spindle Speed Override	100%
Feedrate Override	100%
Run Status (Text)	STOPPED
Path Feedrate	0 m/s
Main Spindle Temperature	24 °C

Mazak Integrex i-300S Data

# Realizing Informative Twins



# Realizing Informative Twins



# Owners have Diverse IT/OT Solutions



Microsoft Azure  
IoT Hub



IBM maximo

MQTT

ARCHIBUS

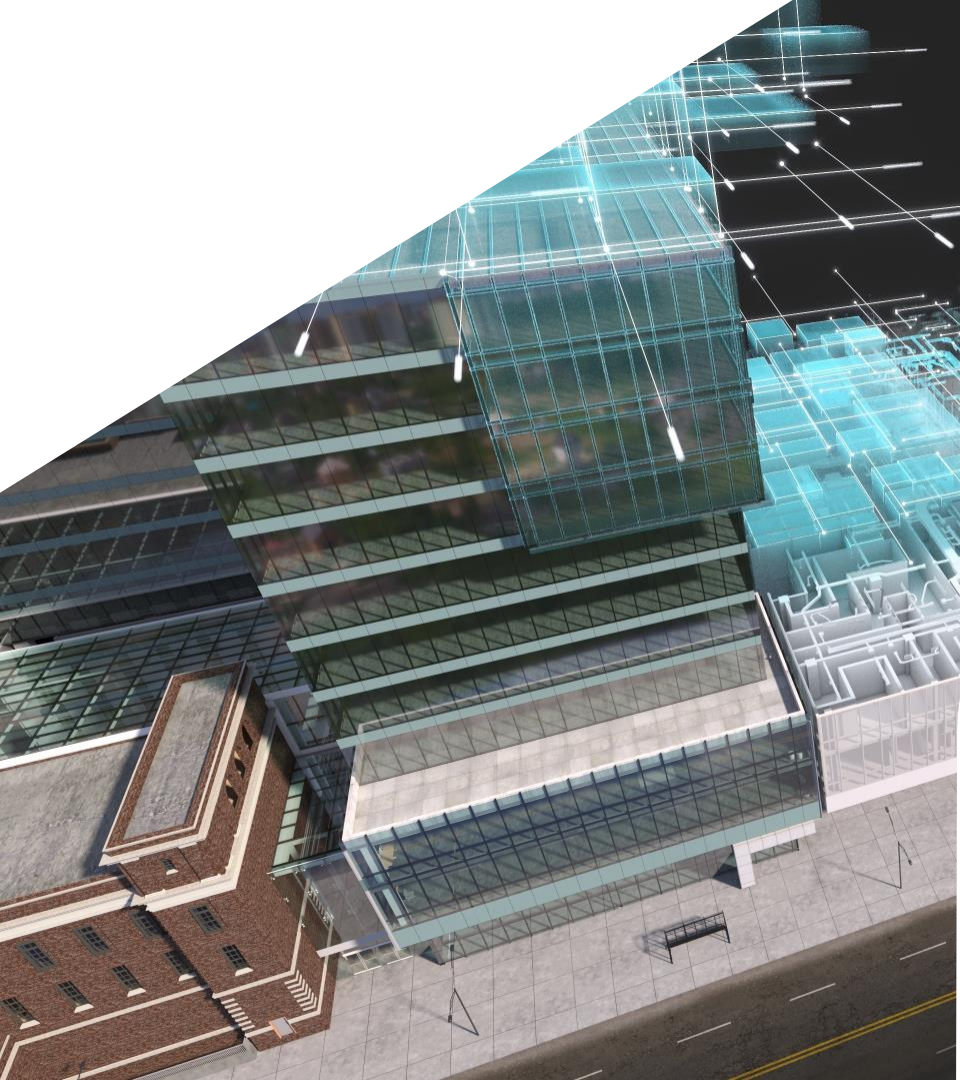


SCADA



How do we enable anyone to connect systems, integrate data, and automate business workflows?





# Autodesk Tandem Connect

Connecting the Operational Ecosystem

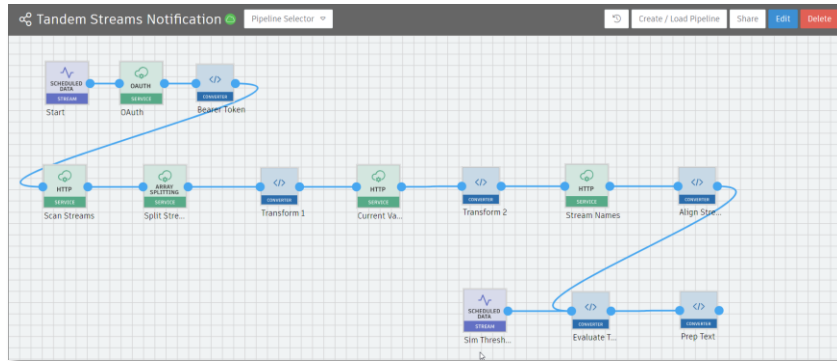
**BETA AVAILABLE NOW**

# Autodesk Tandem Connect Overview

## Integration Platform as a Service (iPaaS)

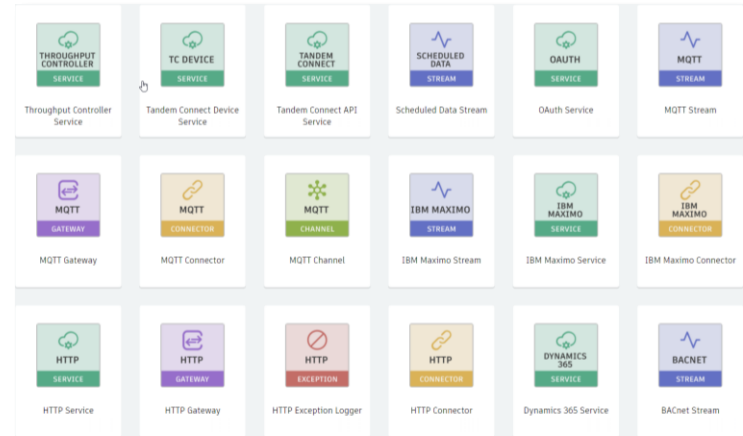
1

Low Code environment for authoring Data Pipelines



2

Library of reusable solutions and plug-ins for common IT/OT systems



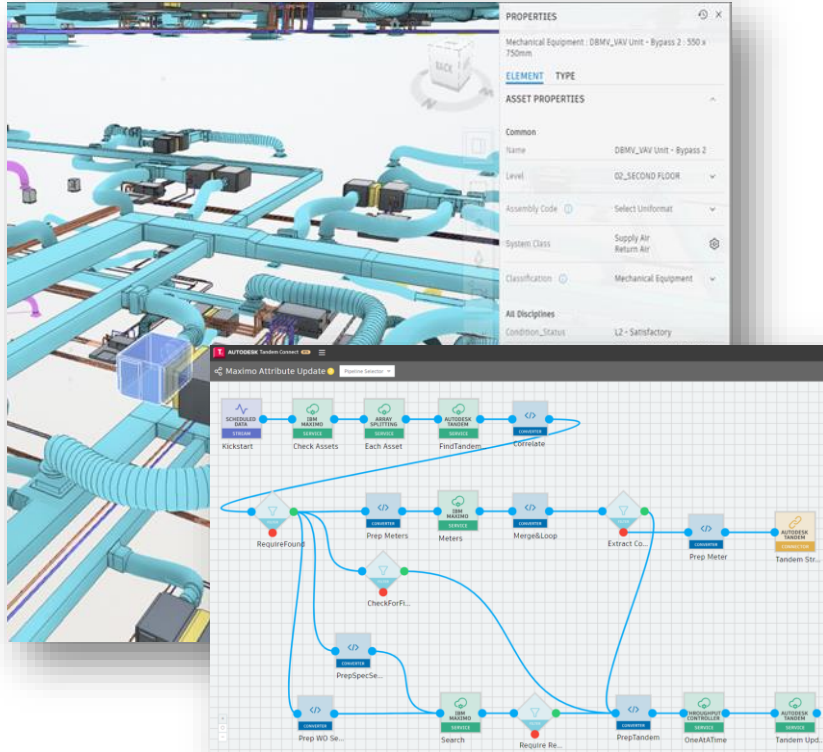
3

Ability to deploy Data Pipelines to the Edge, in the Cloud, or in a Hybrid Environment

44 plugins available today.  
See the full list here:



# Autodesk Tandem Connect Solutions



## Capture Asset Data

Populate data in Autodesk Tandem from existing systems, building product data, and other sources



## Simplify IoT Connectivity

Identify BMS devices and forward data to Autodesk Tandem



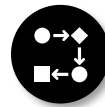
## Accelerate Operational Readiness

Initialize IT systems from data collected in Autodesk Tandem during project delivery



## Unify Sources of Truth

Synchronize data between Autodesk Tandem and enterprise systems



## Automate Workflows across Systems

Trigger creation of inspection workorders when stream thresholds are exceeded



# Case Studies

Ready for Tomorrow, Today



# Digital Twins Revolutionize Preservation

A Scan-to-BIM-to-Digital Twin journey

*“It’s about the amount of data we put into the project—and the information our clients already have at their disposal—and making sure that it’s all organized in a manner that’s actually useful to them.”*

- Charles Thompson, Associate, Quinn Evans

QUINN  
EVANS



- **Enhanced Asset Understanding:** Digital twins give detailed insights into how buildings perform, which is essential for authentic restoration. This helps in understanding the physical function of buildings, making preservation efforts more effective.
- **Streamlined Documentation Process:** Using Autodesk Tandem makes creating digital replicas faster, repeatable, and easier. This tool provides a complete view of assets, including MEP systems, improving the efficiency and accuracy of documentation.
- **Efficient Decision-Making:** Digital twins provide quick access to both historical and near real-time building data. This speeds up decision-making, especially for older buildings, by reducing the time needed to find information.

Learn more: <https://intandem.autodesk.com/resource/realizing-the-potential-of-digital-twins-for-building-preservation-and-restoration-efforts/>

# Seamless Transition, Maximum Efficiency

Aiming for continuity from construction to operation, with maximum operational efficiency

*“We are planning to scale the digital twin implementation to all of our stations.”*

*- Dr. Özgür Soy, General Manager, President of the Eurasia Region and Vice President of the International Association of Public Transport (UITP)*



- **Operational Efficiency and Quality Service:** Utilized Autodesk Tandem to enhance service quality, minimizing downtime, and optimizing resource utilization.
- **Innovative and Comprehensive Operations:** The pilot increased operational efficiency by up to **37.5%** and aimed for **25% savings** in energy and maintenance costs.
- **Sustainability and Energy Efficiency:** The pilot aligned with UN Sustainable Development Goals, supported energy consumption analysis and optimization, contributing to sustainability practices and efficient resource usage.

Learn more: <https://intandem.autodesk.com/resource/metro-stations-conducting-efficient-operations-with-digital-twins/>



# A new era of Smart Sustainability

Developing a smart museum for future generations

*“With the insights from Autodesk Tandem, the Wright Museum expects it will begin to not only understand their building better, but also use their insights for capital planning, space management, and much more.”*

*- Jeff Anderson, Executive Vice President and COO*



THE WRIGHT MUSEUM



- **Smart Museum Transformation:** The Charles H. Wright Museum has adopted digital twin technology, enhanced facility management and is setting a precedent for sustainability.
- **Innovative Approach to Sustainability:** Utilizing a digital twin, the museum has been able to collect and analyze operational data, refining experiences and promoting environmental awareness.
- **Pioneering Museum Sustainability Practices:** Through its digital transformation, the Wright Museum has integrated sustainability into its operations, educated visitors on environmental issues, and become a leader for other cultural institutions.

Learn more: <https://intandem.autodesk.com/resource/the-charles-h-wright-museums-digital-transformation-to-becoming-a-smart-museum/>

