



Twinning for Success

The power of truly connected intelligent assets

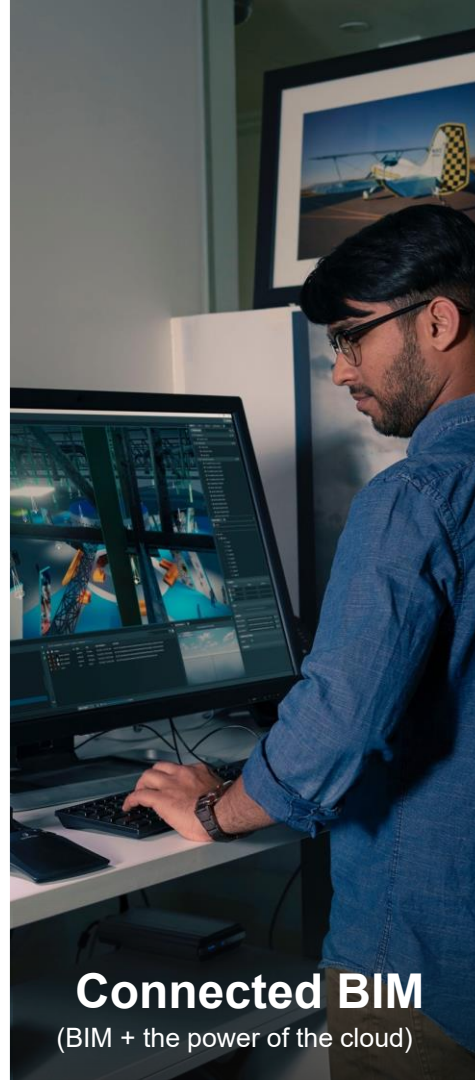
Magnolia Garcia
Autodesk, Solution Engineer - Infrastructure



CAD



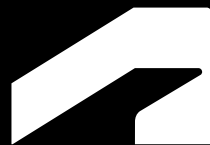
BIM



Connected BIM
(BIM + the power of the cloud)



Future of Making



Digital Twin

Challenges & Opportunities

What is a Digital Twin?



Simulate



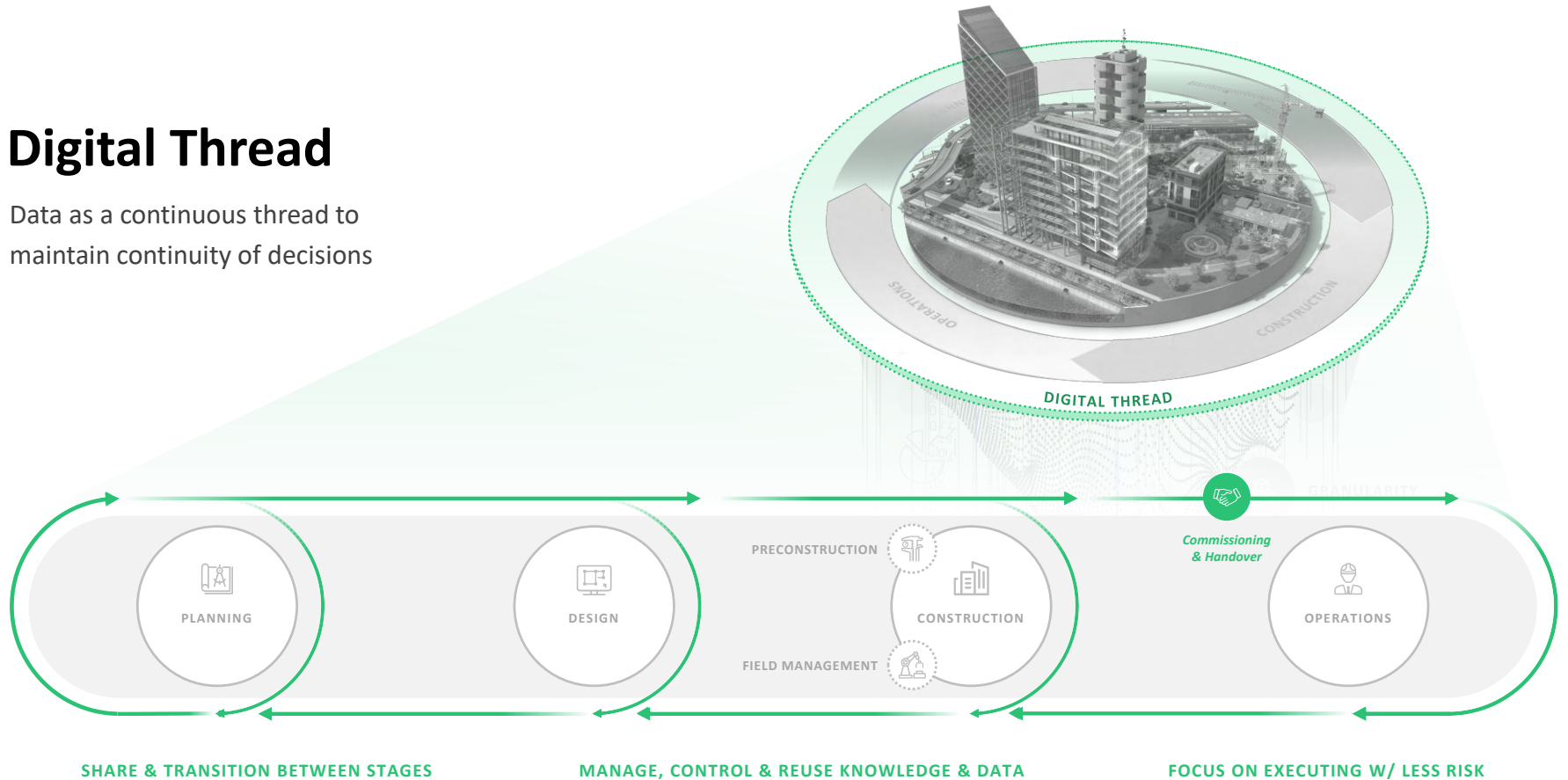
Predict



Inform

Digital Thread

Data as a continuous thread to maintain continuity of decisions



BIM before TWIN

Digital by Default

Source: 2021 Australian Infrastructure Plan

TIMEFRAME

Medium term (5-10 years)

GEOGRAPHY

National

SECTOR

Industry productivity and innovation

POLICY PRIORITIES / FUTURE SCENARIOS

Economic benefits
Productive cities
Connected regions

Recommendation 3.3:

Increase productivity and embed a culture of innovation in the infrastructure sector by adopting an evidence-based digital by default approach to infrastructure planning, delivery and operations.



Quality

Digital twin

Percentage of Australian Government funded projects incorporate a digital twin, using a harmonised approach

Target: 100%

Timeframe: 0-5 5-10 **10-15** 15+



Governance

National digital infrastructure roadmap

National digital infrastructure roadmap published, with progress reports

Target: Published annually Timeframe: 0-5 5-10 **10-15** 15+



Governance

Digital asset champions

Percentage of projects over \$50 million (2021 \$) that have digital asset champion roles

Target: 100% Timeframe: 0-5 5-10 **10-15** 15+

Victorian Digital Asset Strategy

The Victorian Digital Asset Strategy sets out a whole-of-government strategy for digitising construction.

Together we can use digital engineering to develop and maintain cost-effective, innovative and value-adding assets for all Victorians for decades to come.

The Victorian Digital Asset Strategy (VDAS) is a step change in the way Victorian Government departments and agencies plan, deliver, operate and maintain the assets they manage on behalf of the people of Victoria.

Victoria is excited to lead the way in developing contemporary and detailed guidance to the many stakeholders that deliver Victoria's projects and assets.

The VDAS sets out the vital process for safeguarding the digital systems that will allow us to monitor and improve the creation and management of infrastructure assets in Victoria.



Transport for NSW

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[Projects](#)

[Operations](#)

[Industry](#)

[Data and](#)

[Home](#) / [Digital Engineering](#) / [The Digital Engineering Framework](#)

The Digital Engineering Framework

Since the launch of the Digital Engineering (DE) Framework in September 2018, there have been a series of releases, adding additional capabilities and updating key documents to reflect lessons learned on pilot projects.

The DE Framework will continue to develop new capabilities, whilst working closely with projects as they embrace new digital ways of working.

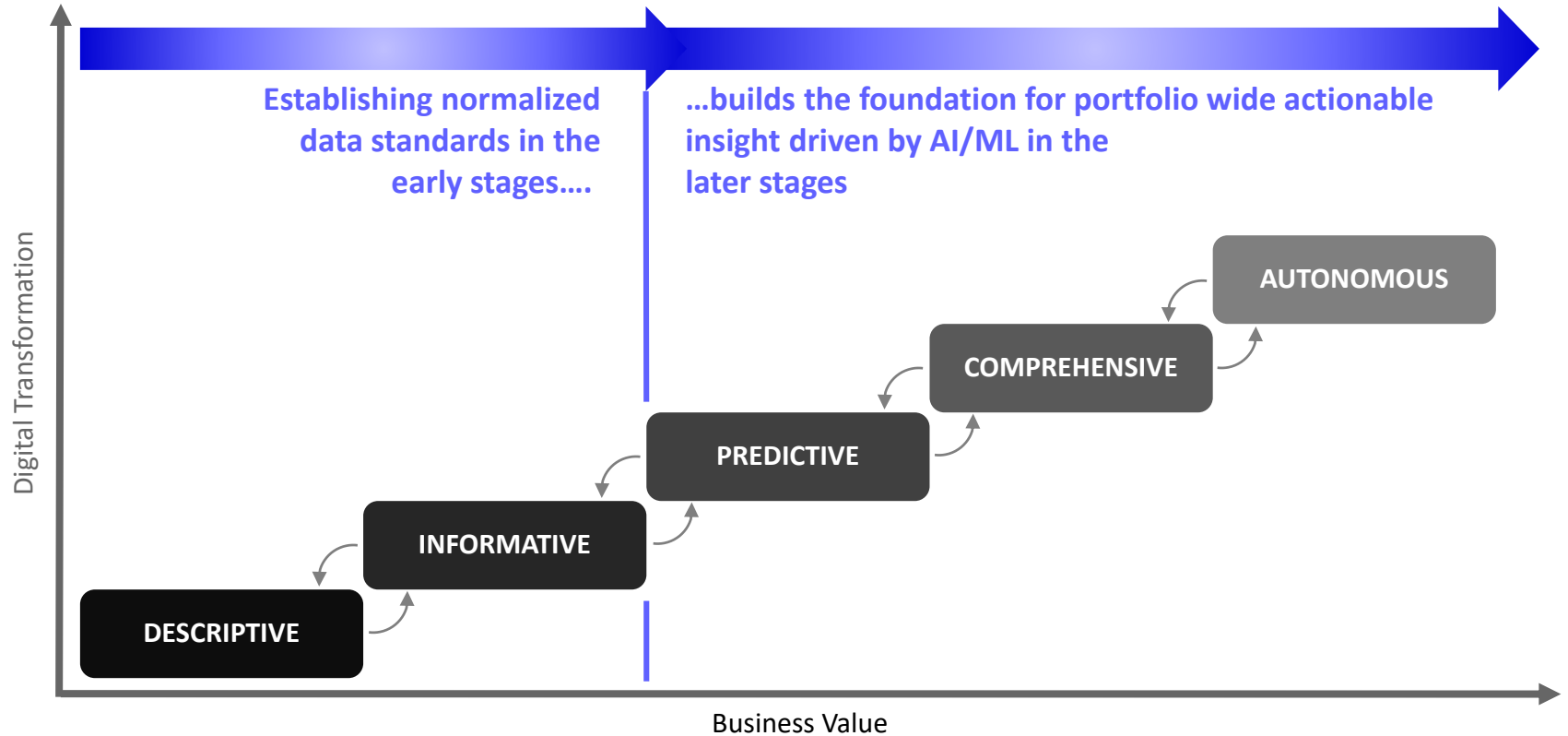
Document library

This library contains many of our key documents released since the DE Framework launched in September 2018. These documents support both the Client-side and Contractors, and include technical guides, procurement / contract documents, management plan documents and a range of tools and templates.

There are some additional documents that are available to Transport staff and our DE Projects. If you're interested in a particular document that's not publicly available, please email us at Digital.Engineering@transport.nsw.gov.au

Document types

Digital Twin Maturity Model

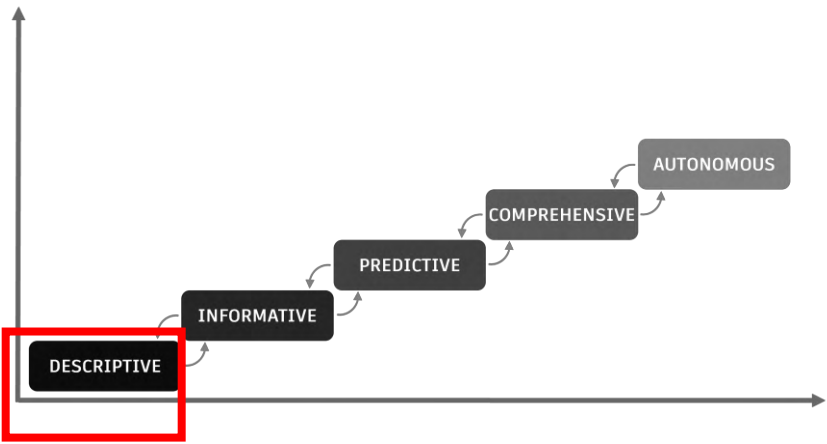


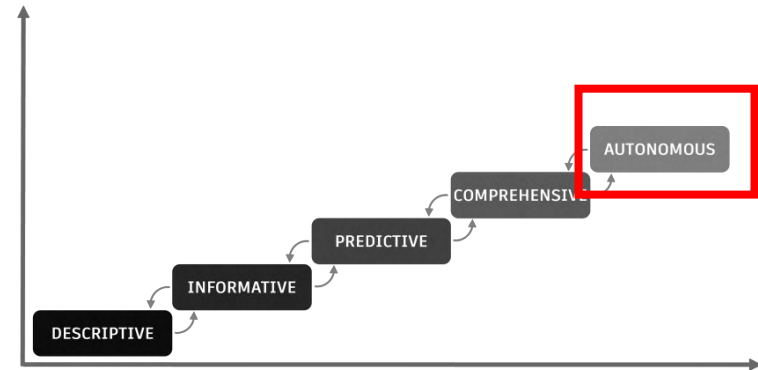
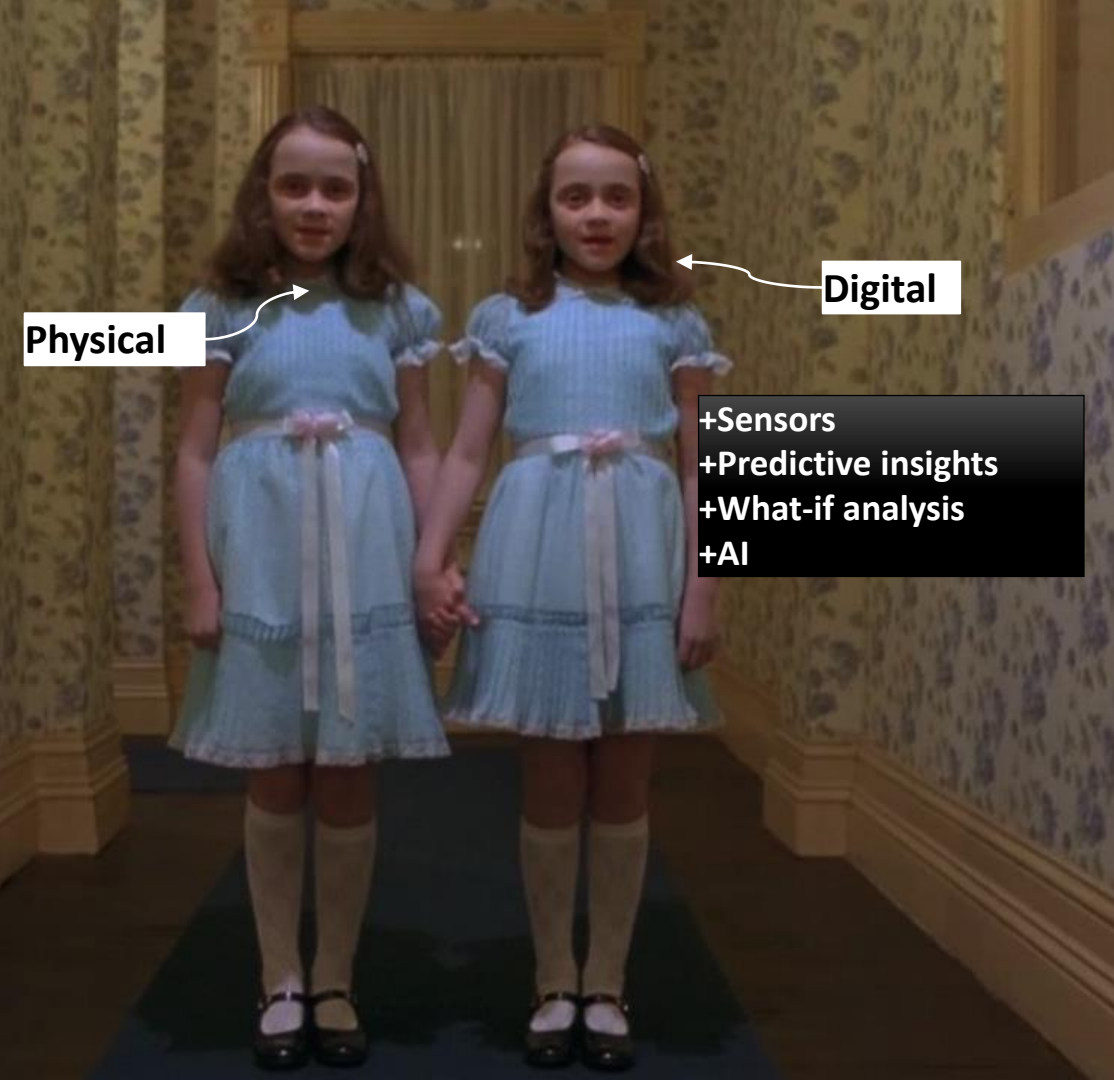
TWINS



Physical

Digital







AUTODESK Tandem

Twin Building

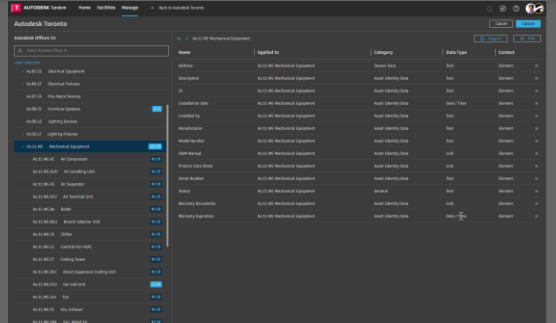
Harness BIM to define and build your digital twin with connections to operational systems and data

Insightful Operations

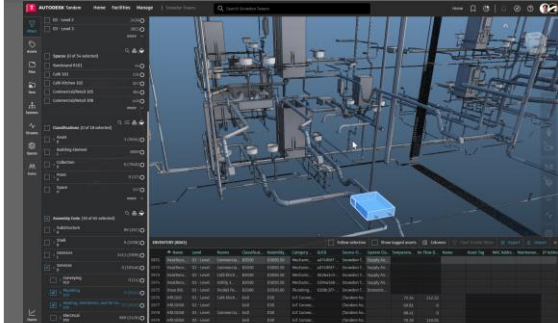
Inform everyday decisions with insight from your digital twin to improve efficiency and reduce cost

Twin Building Process

Define



Contribute



Verify



STREAMS + Create

Filters

Assets Host

Files

- ZNA003
Flow Input 152 L/s
Zone Temp 22.5 °C
- VAV307 0 of 1
- ZNA001
Flow Input 136 L/s
Zone Temp 22.5 °C
- VAV316 0 of 1
- ZNAL12
Flow Input 40 L/s
Zone CO2 445 ppm
Zone RH 22%
Zone Temp 23 °C
- VAV317 0 of 1
- ZNAL13
Flow Input 74 L/s
Zone CO2 425 ppm
Zone RH 25%
Zone Temp 22.9 °C
- VAV318 0 of 1
- ZNAL03
Flow Input 176 L/s
- VAV319 1 of 1
- ZNAM03
Flow Input 55 L/s
Zone CO2 657 ppm
Zone RH 23%
Zone Temp 24.4 °C
- VAV320 1 of 1
- ZNAM04

Systems

Streams

Spaces

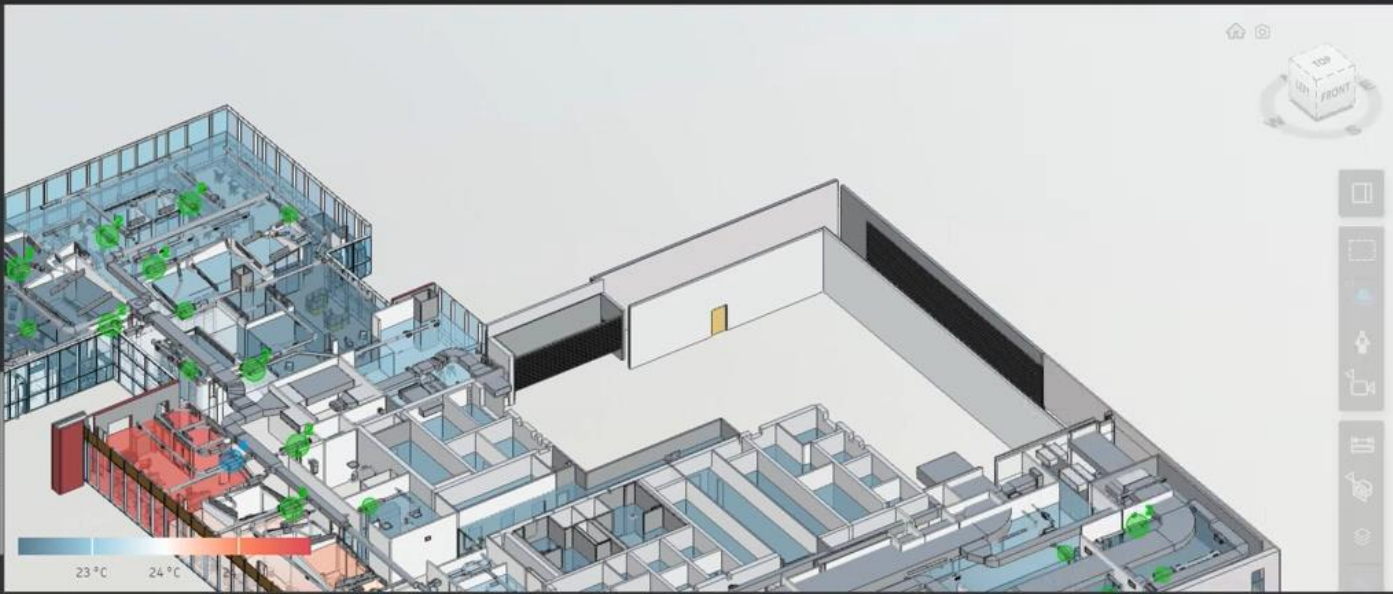
Users

Charts

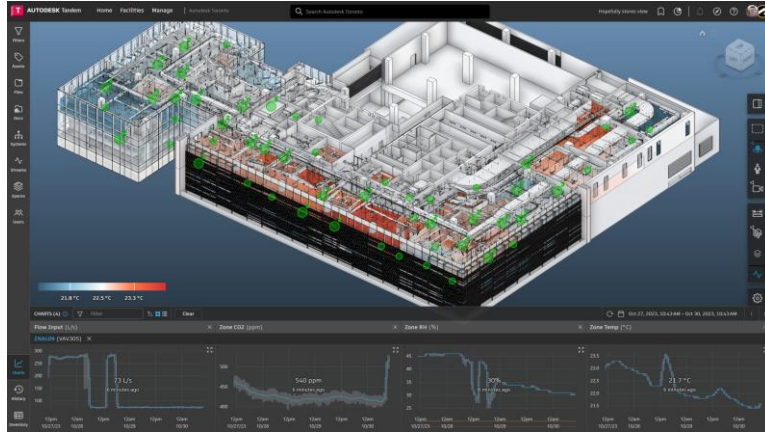
History

Inventory

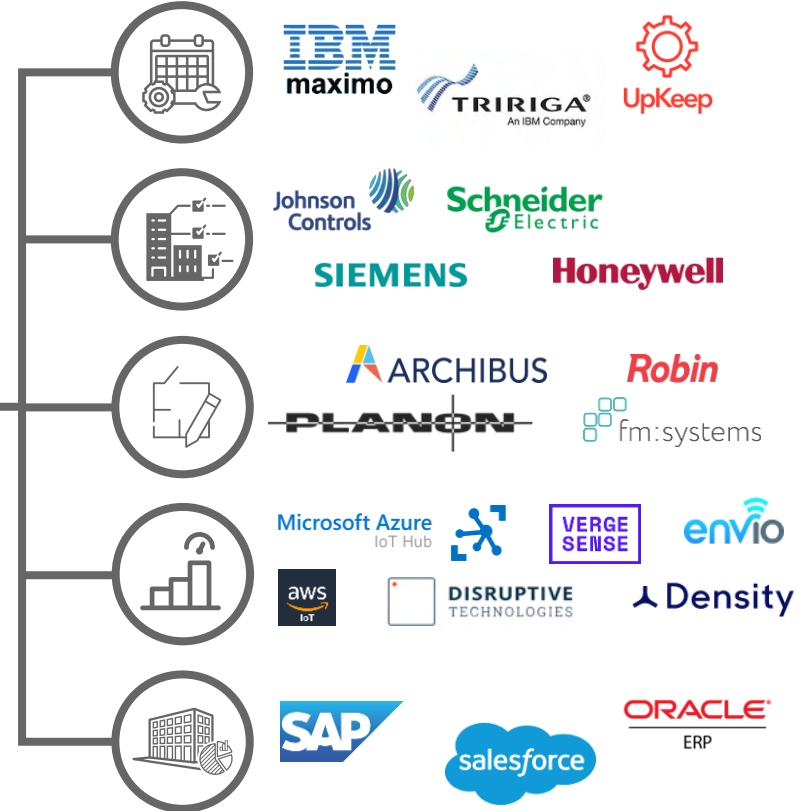
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[Classify it in the properties panel](#)



Connecting the Ecosystem



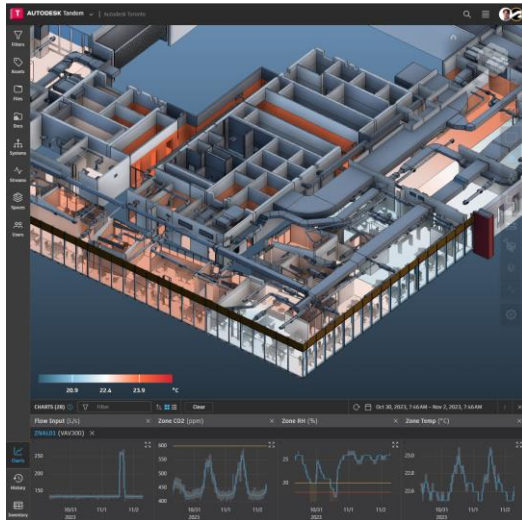
Autodesk Tandem needs the ability to connect and bi-directionally share data with many operational systems



- Maintenance:** IBM maximo, TRIRIGA (An IBM Company), UpKeep
- Building Management:** Johnson Controls, Schneider Electric, SIEMENS, Honeywell
- Construction:** ARCHIBUS, PLANON, Robin, fm:systems
- Analytics:** Microsoft Azure IoT Hub, VERGE SENSE, AWS IoT, DISRUPTIVE TECHNOLOGIES, envio, Density
- Facilities:** SAP, salesforce, ORACLE ERP

Autodesk Tandem Connect – Beta Coming Soon

Integration Platform as a Service (iPaaS)



AUTODESK
Tandem



AUTODESK
Tandem Connect

New Add-on to
Autodesk Tandem



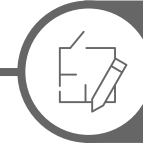
Maintenance Management

Tickets, Alerts, Schedules, Technicians



Building Management Systems

Building Control Systems, Lighting, Security, Etc.



Space Management

Space Planning, Booking, Occupancy



Performance Management

Utilization, Environment, Energy, Weather, Etc.



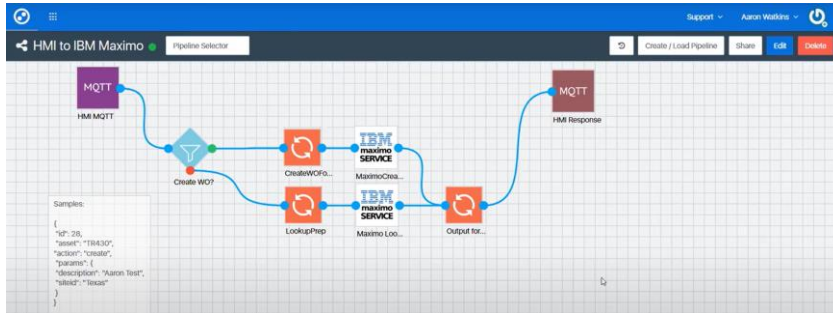
Business Systems

Tenant and Portfolio Applications, Etc.

Tandem Connect Overview

1

No Code / Low Code Environment for Data Pipeline Authoring



2

Rich Library of IT/OT Plug-ins for authoring Data Pipelines

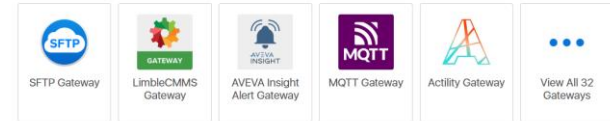
CONNECTORS

Connector Plugins enable you to push data to any other platforms, back-ends and cloud services. These plugins allow you to incorporate and synchronize your data with external services.



GATEWAYS

Gateway Plugins provide server processes allowing communication from sensors, and applications to be pushed up to the Reekoh platform via protocols such as MQTT, TCP, UDP and application-specific protocols.



3

Ability to Deploy these Data Pipelines to the Locally, in the Cloud, or a Hybrid Environment

Example Use Case of Tandem Connect

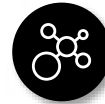
Synchronize Data between Tandem and Maximo

The image shows a 3D CAD model of mechanical equipment, likely a bypass unit, with a properties panel on the right. The properties panel displays the following information:

PROPERTIES	
Mechanical Equipment: DBM4_VRM Unit - Bypass 2: 550 x 750mm	
ELEMENT TYPE	
ASSET PROPERTIES	
Common	
Name	DBM4_VRM Unit - Bypass 2
Level	02_SECOND FLOOR
Assembly Code	Select Uniformat
System Class	Supply Air Return Air
Classification	Mechanical Equipment
All Disciplines	
Condition_Status	L2 - Satisfactory
Expected_Life	2049-05-02T00:00:00+00:00
Install_Date	5/1/2023
Maximo_ID	2133
Maximo_Stock_Code	400-1000-000-1003

Below the CAD model is a screenshot of the Tandem Connect workflow diagram. The diagram shows a complex flow of data between IBM Maximo and Tandem. Key components include:

- IBM Maximo** services: Kickstart, Check Assets, EachAsset, PrepMeters, Meters, MergeAndLoop, Extract Co., Prep Meter, TandemStream, PrepMeters, Meters, MergeAndLoop, Extract Co., Prep Meter, TandemStream, PrepMeters, Meters, MergeAndLoop, Extract Co., Prep Meter, TandemStream.
- Tandem** services: Kickstart, Check Assets, EachAsset, PrepMeters, Meters, MergeAndLoop, Extract Co., Prep Meter, TandemStream.
- Logic**: Decision diamonds for 'Require Found', 'Check For...', 'Require Re...', and 'Require Re...'. Flow lines connect these services and logic points.
- Output**: A 'Work Orders' box and a 'Tandem Update' box.



Identify BMS devices and forward data to Autodesk Tandem



Initialise IT systems from data in Autodesk Tandem to accelerate operational readiness



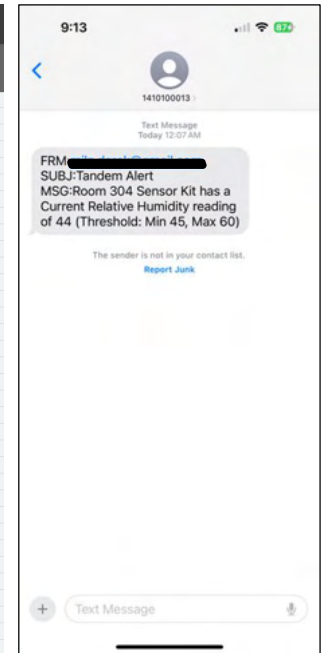
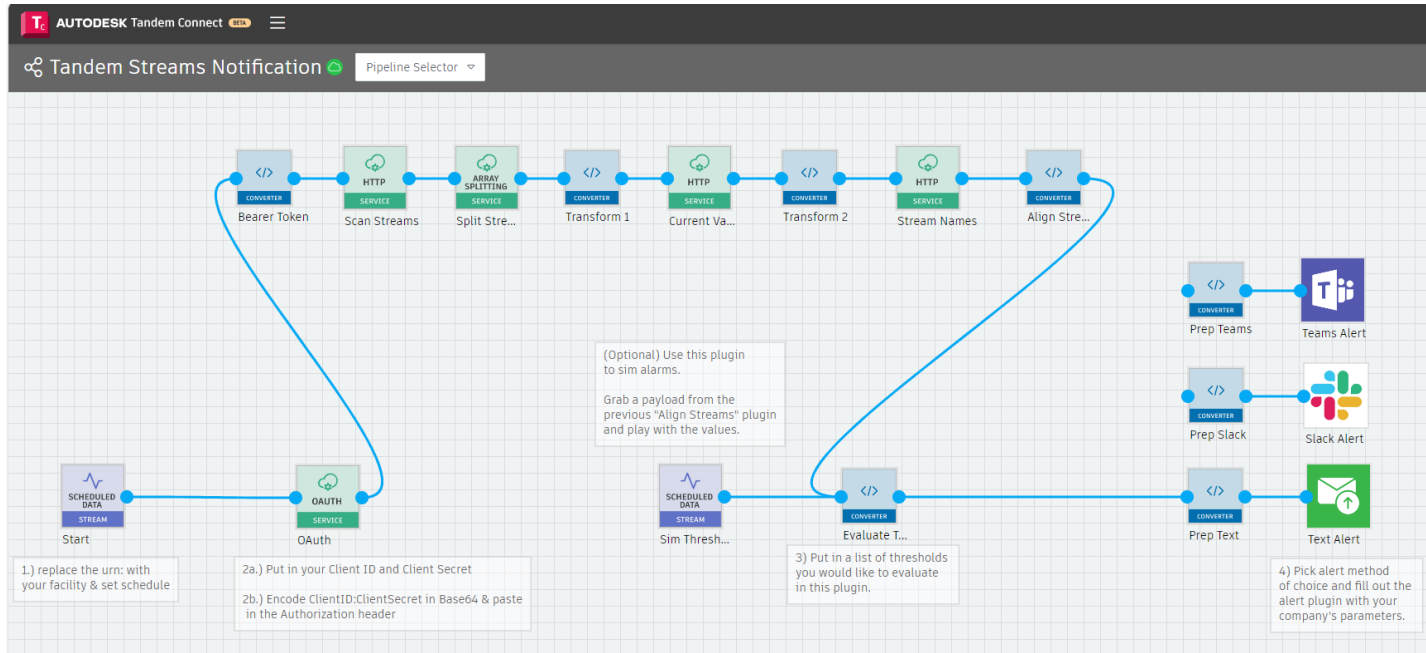
Synchronize changes between Autodesk Tandem and IBM Maximo



Trigger creation of an inspection workorder in IBM Maximo when a stream threshold is exceeded

Example Use Case of Tandem Connect

Enhance Tandem Capabilities – SMS alert



Tandem + Eptura – Beta Coming Soon

Digital Twin Enriched Operations



BIM/VDC
DIRECTOR



AEC SERVICES
DIRECTOR



REAL ESTATE &
FACILITIES DIRECTOR



SPACE & WORKPLACE
PLANNER



FACILITY MANAGER
& ENGINEER

T

Tandem Digital Twin

Digital twin insights on assets, spaces and systems

Smarter digital
handover &
Warranty

Facility IoT
data and asset
analytics

3D and dashboard
visualizations

APIs + Tandem Connect FOR IT/OT INTEGRATION



Eptura IWMS/CMMS

Workflow management for asset, maintenance and spaces

Maintenance
Planning &
Scheduling

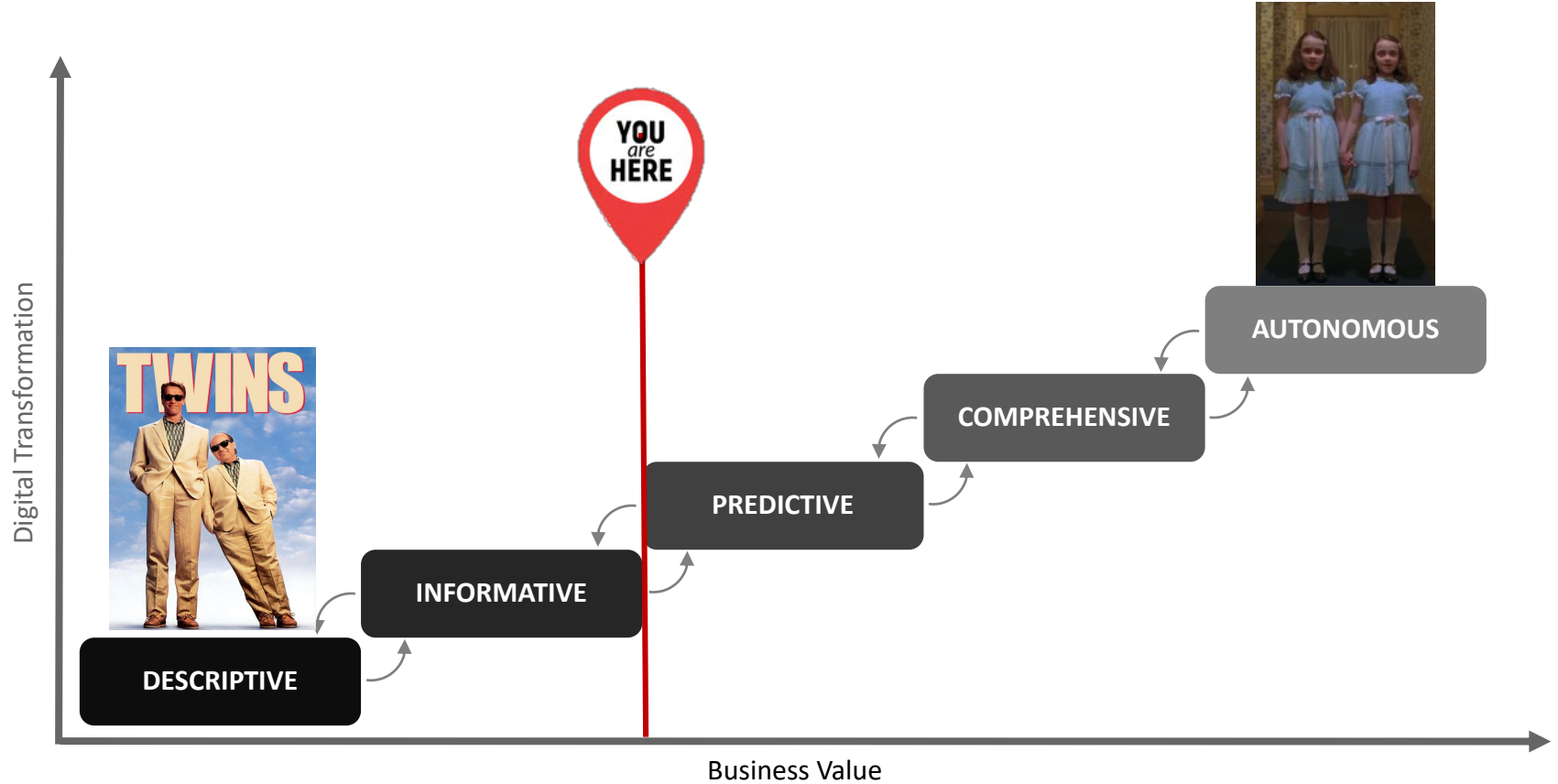
Space Planning &
Management

Workplace and
Visitor Experience

APIs TO BUSINESS SYSTEMS

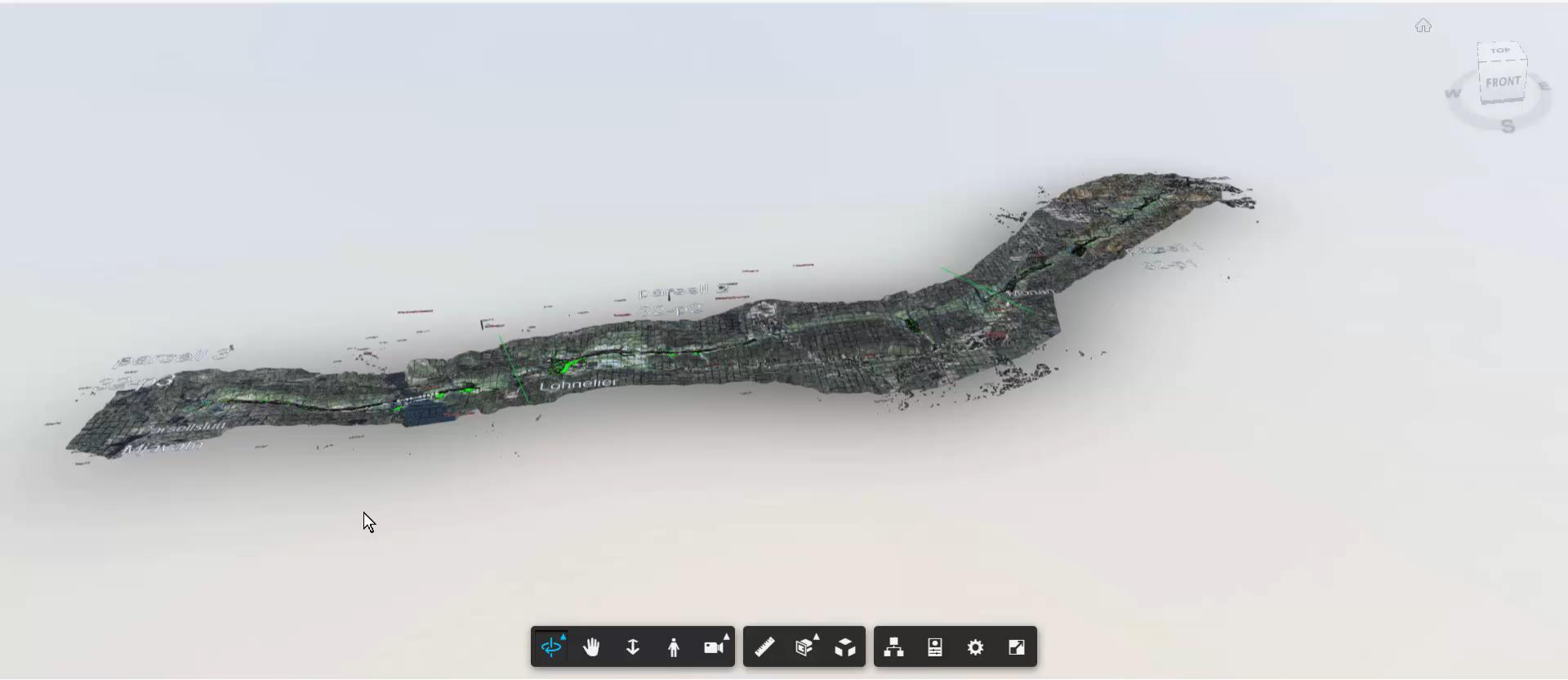
CMMS – Computerized Maintenance Management System
IWMS – Integrated Workplace Management System

Digital Twin Maturity Model





AUTODESK
Platform Services



0 km 1 km 2 km 3 km 4 km 5 km 6 km 7 km 8 km 9 km 10 km 11 km 12 km 13 km 14 km 15 km 16 km 17 km



Join the Journey



Tandem Free*

- ✓ 1,000 Assets¹
- ✓ 200 Streams²
- ✓ 14 Days of Time-Series History



www.intandem.autodesk.com

AUTODESK Platform Services



www.aps.autodesk.com

