



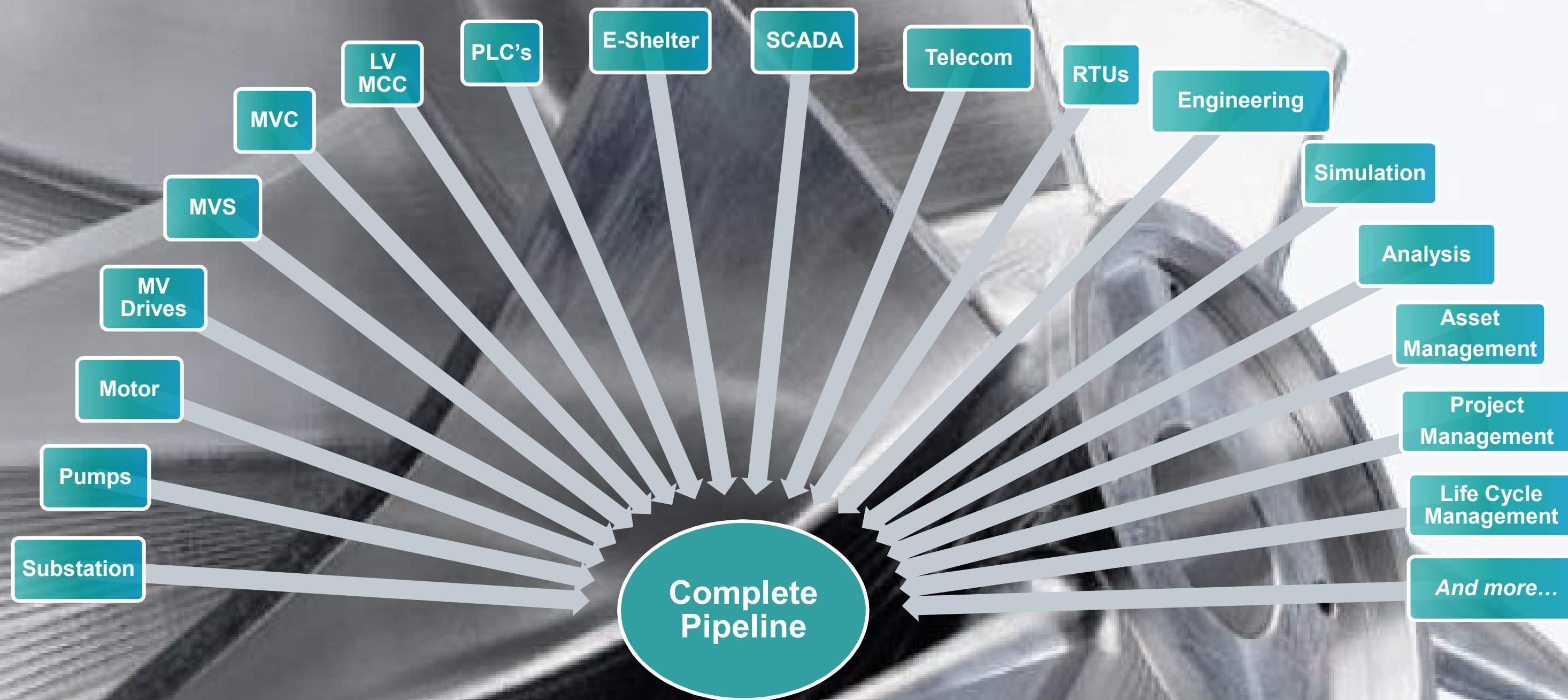
SOGIC 2018

Advanced Pipeline Technologies

May 8, 2018 | Hyatt Regency, Calgary, Alberta

SOLUTIONS Pipeline Capabilities

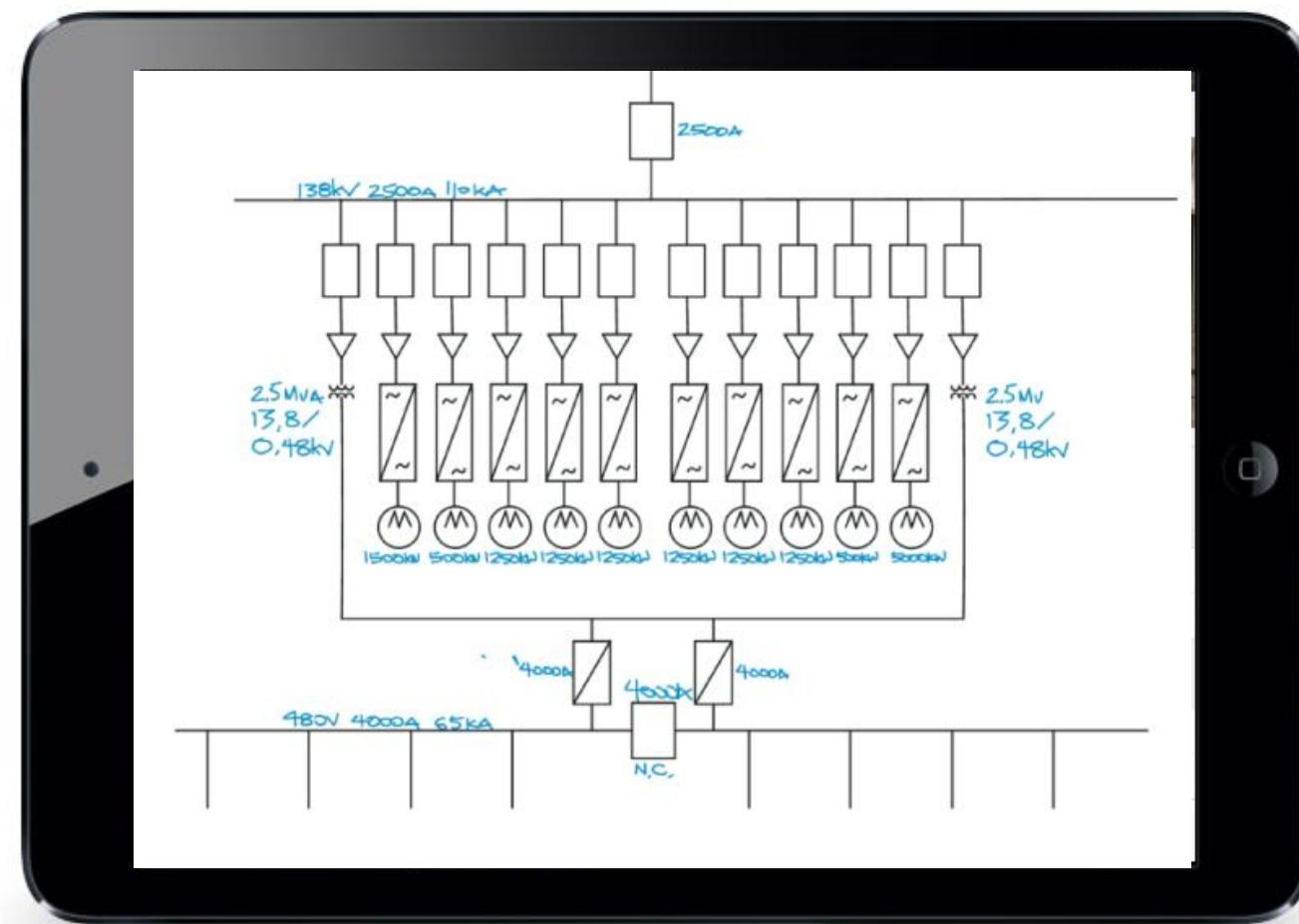
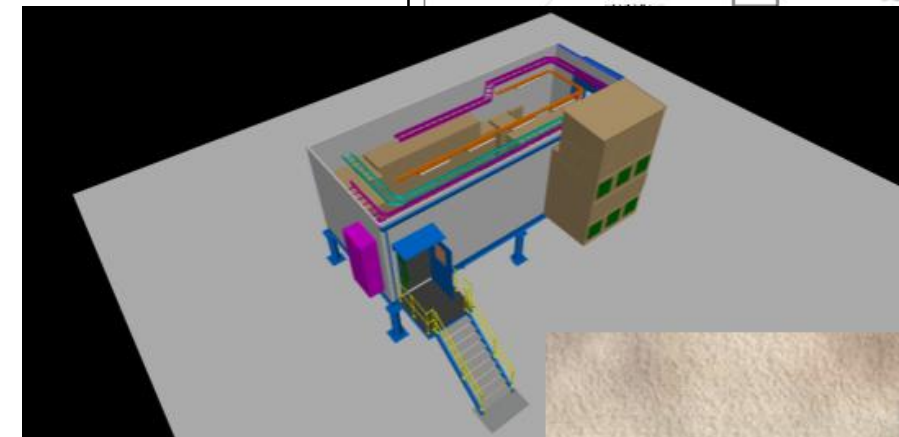
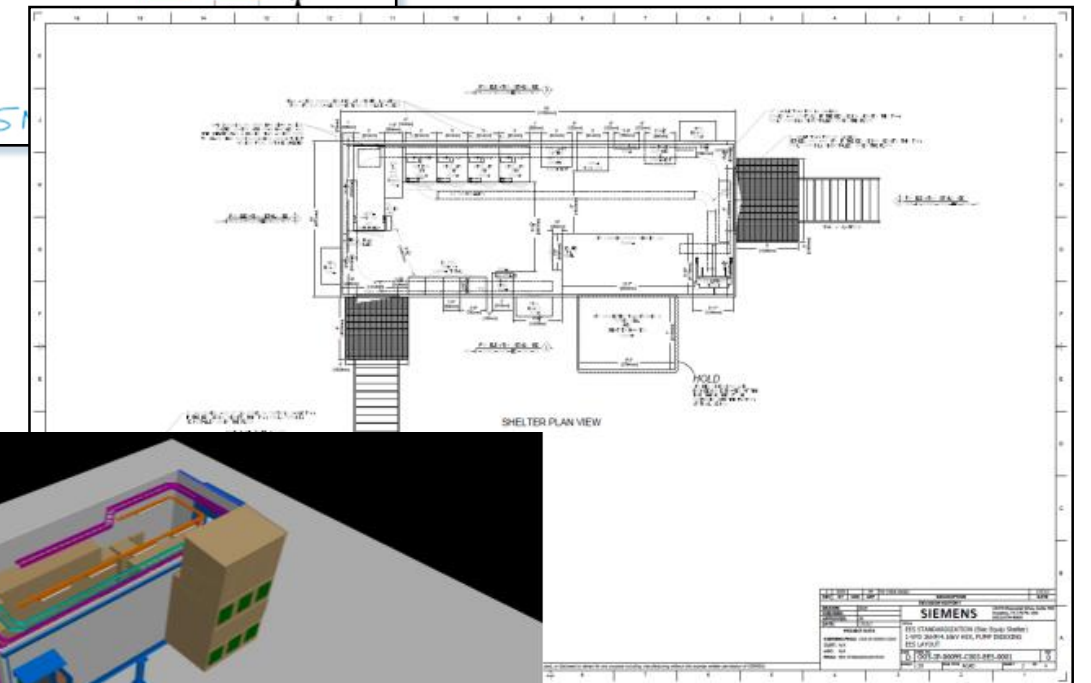
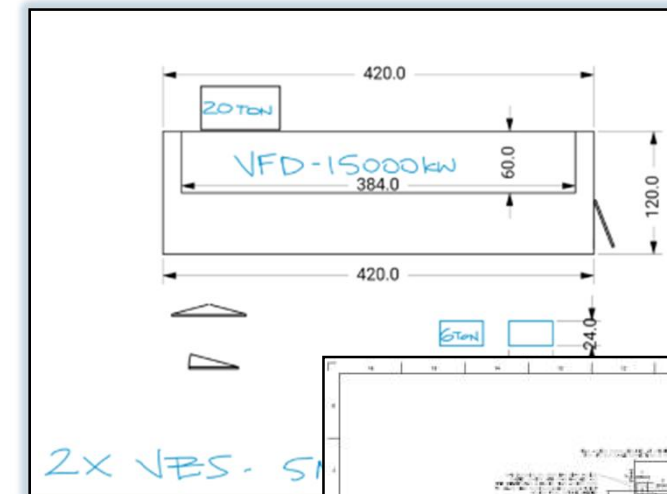
SIEMENS



Sketch to Product Twin



SIEMENS
Ingenuity for life



Iterative Optimization Benefits at Concept Stage

Design-to-Cost Case Study



MVS:

- Evaluate Starting Option of Metal Enclosed vs Metal Clad Construction
- Multi-Function Relays
- 4kV Class for scalability 3000hp up to 5000hp
- 7kv Class for scalability 5000+hp and beyond

MVC:

- 4kV and 7kv Class with 2-High Contactors considerably reduces footprint (only good for starting duty)
- Multi-Function Relays

LV MCC:

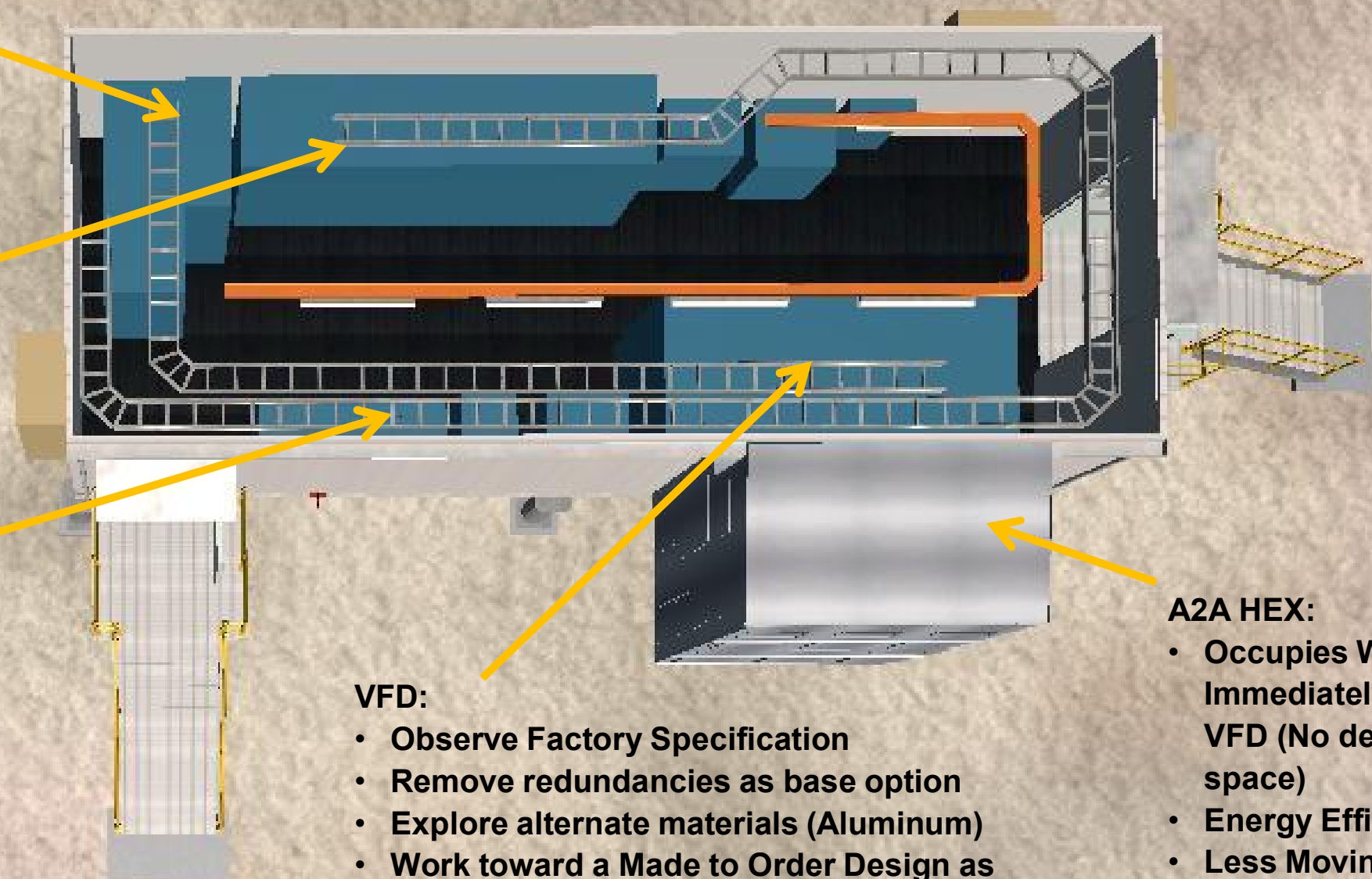
- Continue use of High Density Buckets where possible.
- Continue

VFD:

- Observe Factory Specification
- Remove redundancies as base option
- Explore alternate materials (Aluminum)
- Work toward a Made to Order Design as base option

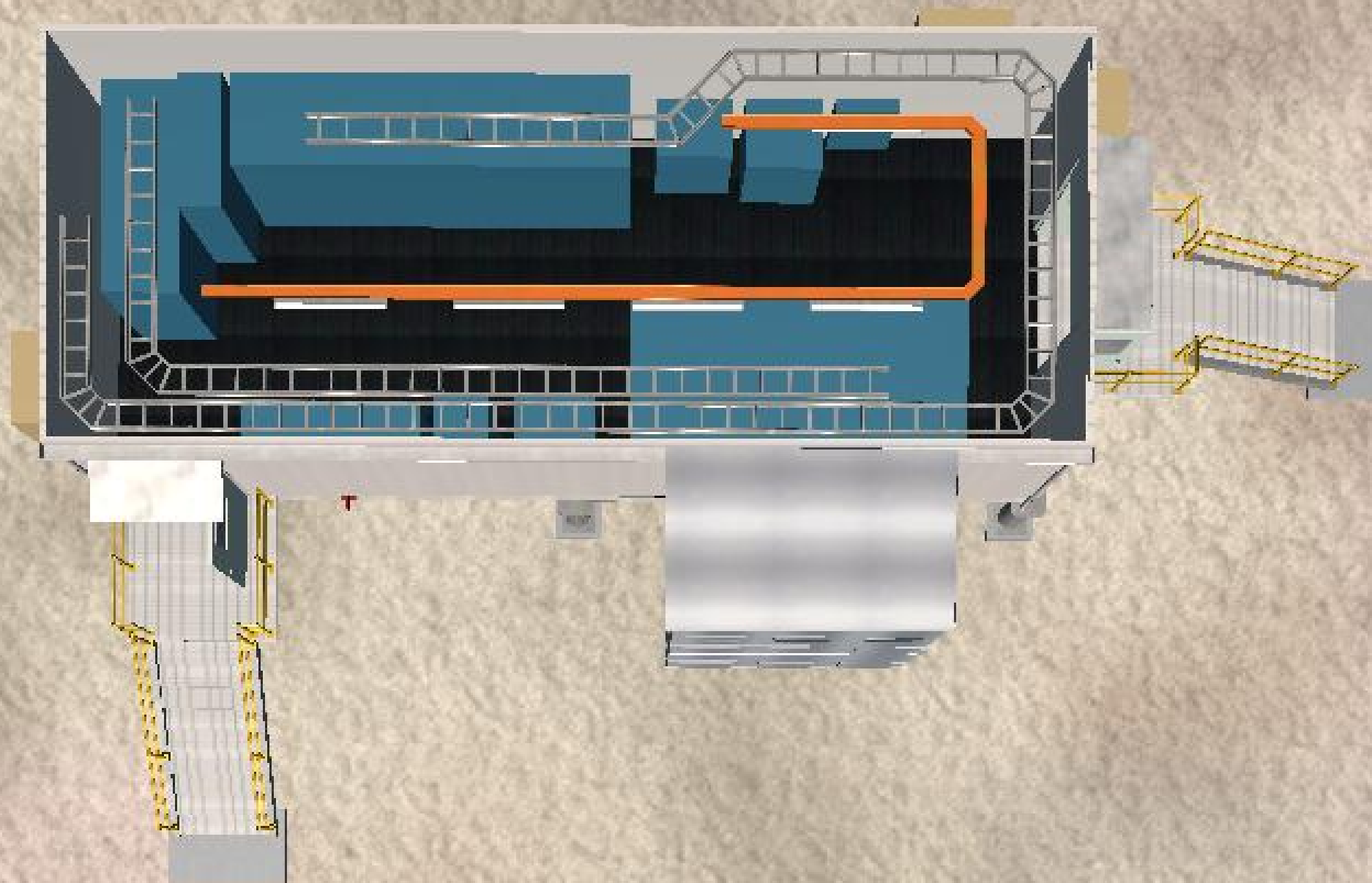
A2A HEX:

- Occupies Wall Space Immediately behind the VFD (No dedicated wall space)
- Energy Efficient vs HVAC
- Less Moving Parts
- Higher Reliability



Iterative Optimization Benefits at Concept Stage

Design-to-Cost Case Study



SOLUTION SMALLER PACKAGE OPTIMIZATIONS:

CAPEX:

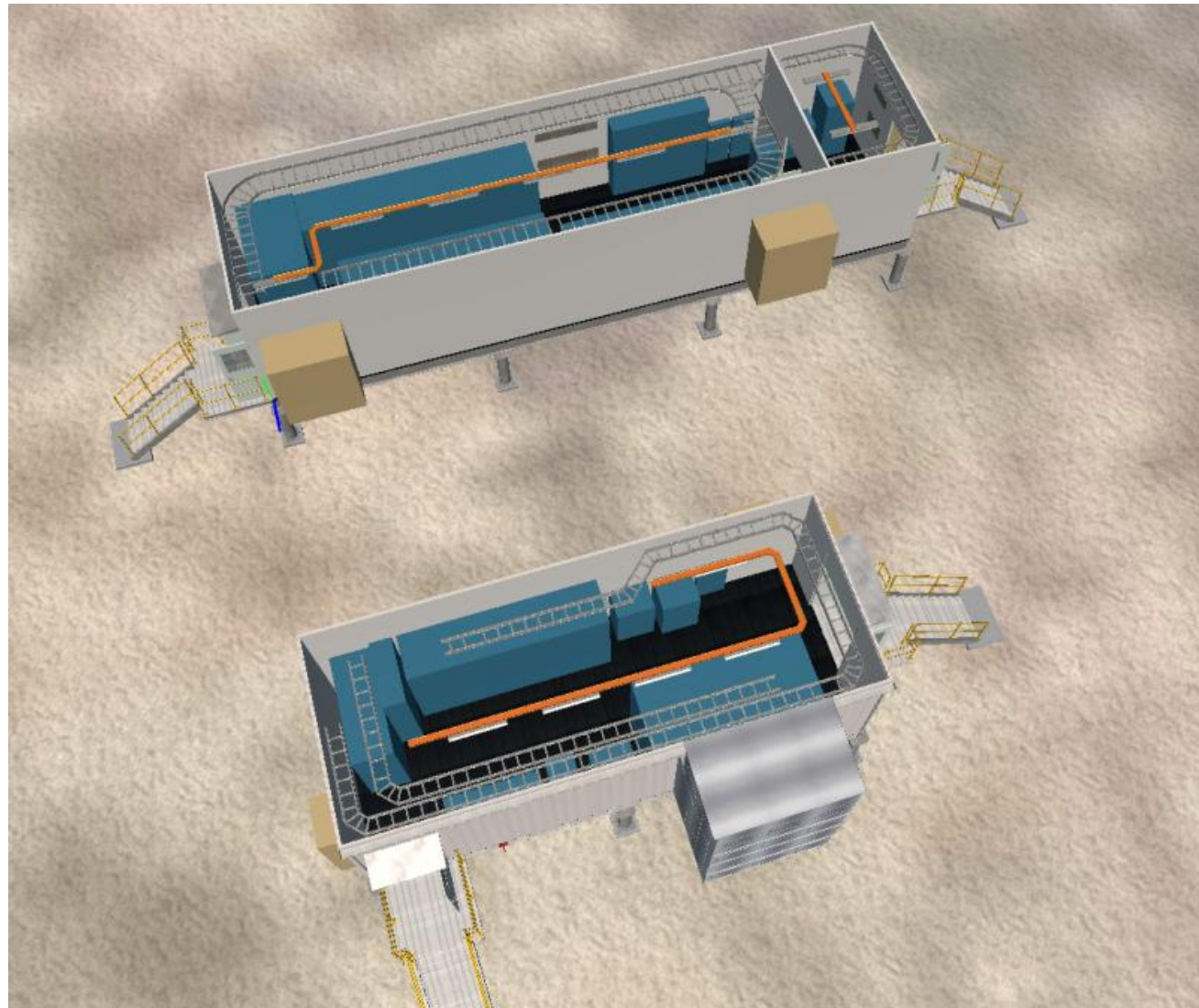
- Material Savings
- Fits E-Shelter Manufacturer's "Sweet Spot"
- Cable Raceway left to Manufacturer's Discretion
- Small Construction Footprint
- Less Weight and Lower Freight costs
- Simplified Logistics
- Typical Rigging

OPEX:

- Less Cooling Volume
- Removal of #1 Warranty Item in EES Designs (Hi Tonnage HVAC)

Iterative Optimization Benefits at Concept Stage

Design-to-Cost Case Study



BEFORE: Requested Electrical Package Size as Specified:
60' L x 15' W x 13'1" H

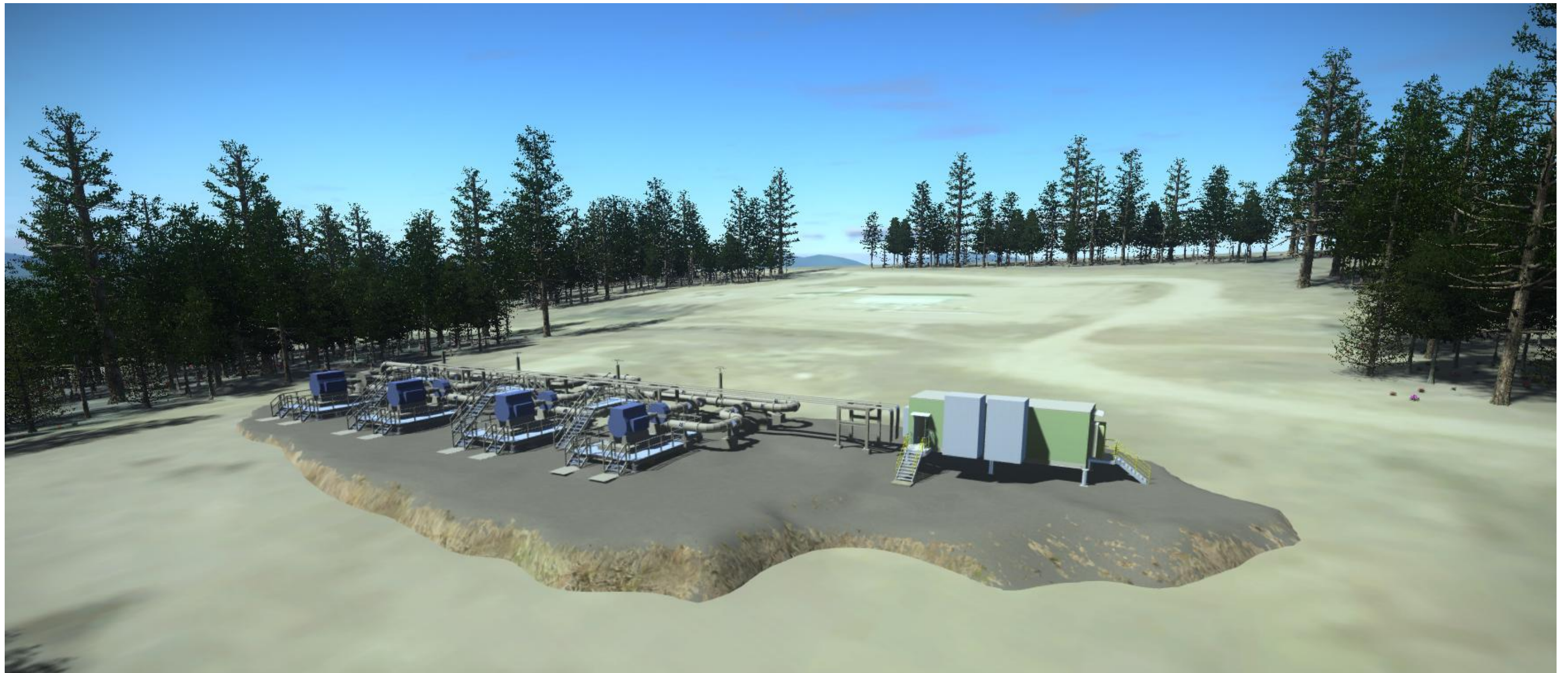
AFTER: Optimized Electrical Package Size:
38' L x 15' W x 13'10" H

Achieved by:

- HEX as standard cooling mechanism vs HVAC based design.
- Depth of Knowledge of Product and Domain expertise
- Managing the change iteratively to arrive at best overall solution
- Includes intangible benefits of lower cooling volume, more Transportable design, weight savings, OPEX savings in addition to obvious functional and CAPEX savings.

Pump Station Rendering

Reduced Pad / Footprint



The Digital Products' Experiential Design Review

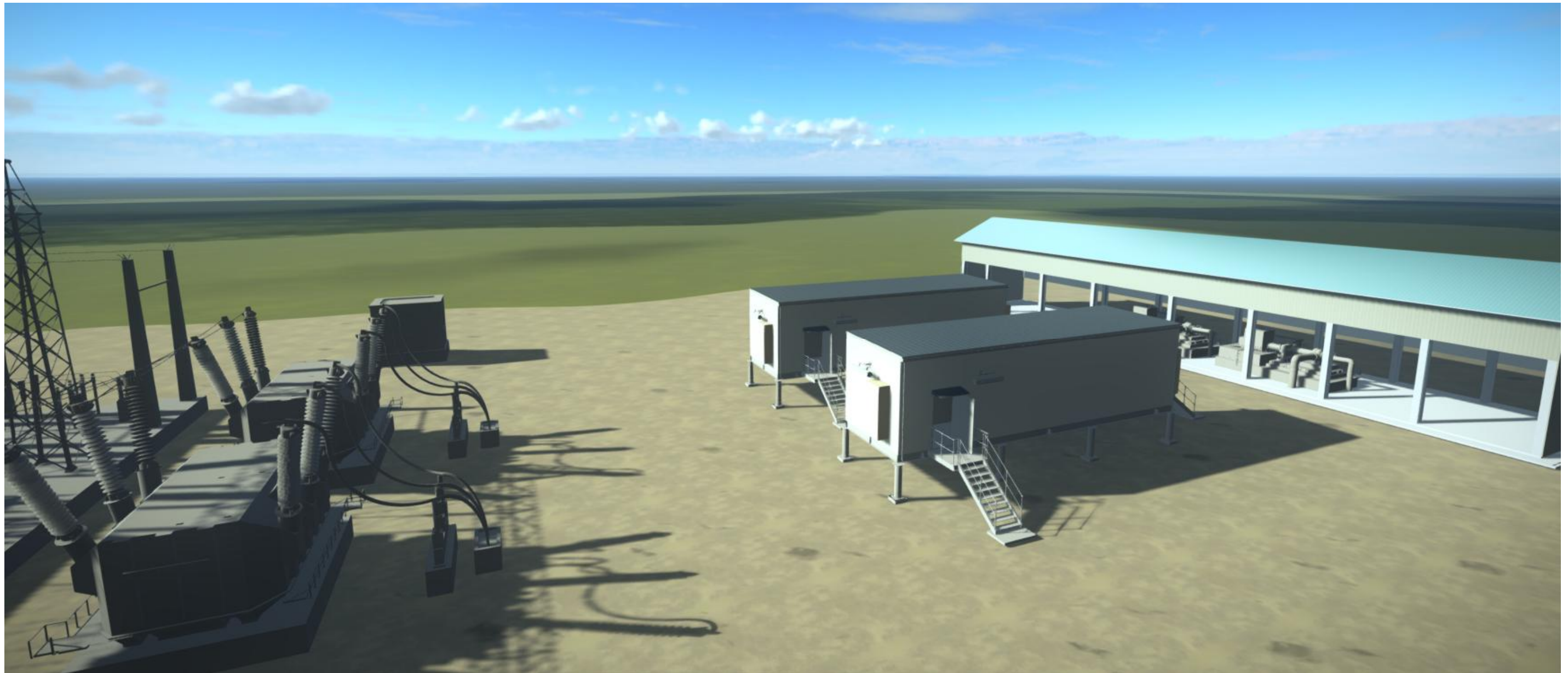


Scalability



Scale-ability and Scope-ability

Water Cooled VFD for Electric Motor Driven Compressor Station Applications



Scale-ability and Scope-ability

Electrical Distribution for Turbine Driven Compressor Station Applications



Asset Clarity



Asset Registry BOM



- Complete SIEMENS Major Component Bill of Material Integration
- Asset Registry designation by class, category and type
- Complete flexibility in naming and definitions for *any* assets
- Pumps, motors, valves, EES, pipe, ROWs, enclosures, etc.
- Robust permissions and security manager
- Growth potential for entire pipeline, not just SIEMENS scope of supply.

Asset Types

Search Types

Core Equip

Circuit Breakers

SF6 Circuit Breakers

Components

Core Equip

Accessories

Circuit Breakers

SF6 Circuit SW

Control Panels

DC System

EES

EHT

Generic Parts

HVAC

LVMCC

Motors

MVC

MVS

NGR

PFCC

Pumps

Relays

Core Equip / Circuit Breakers / SF6 Circuit Breakers

Asset Type Description

Color

Valid Tasks

Identifier Elements

Is Active

ID Info

Status

Dates

Location Data

Measures

ID Info

No Section Description

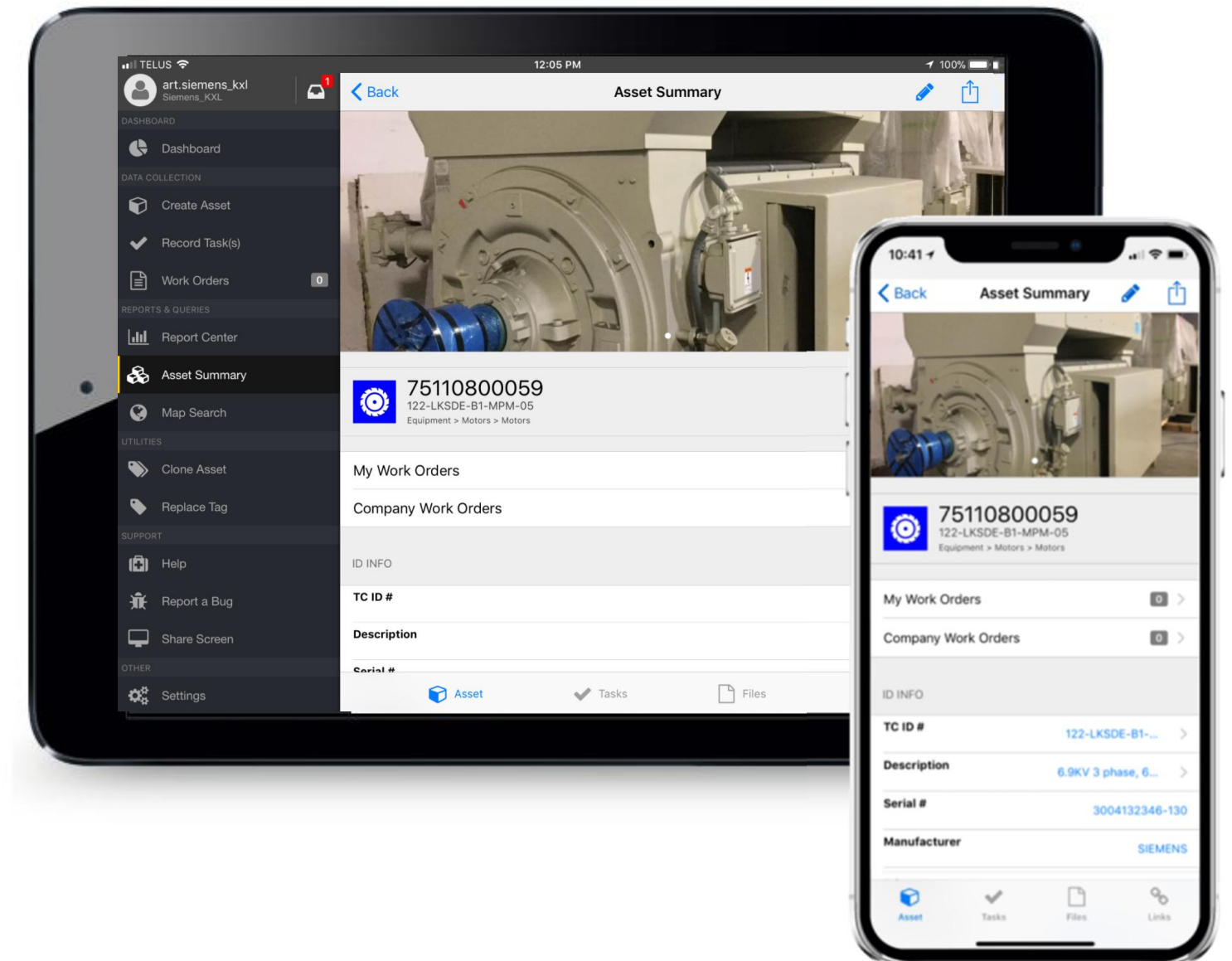
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		1	ID #	TextBox	ID #					
		2	Description	TextBox	Description					
		3	Serial #	TextBox	Serial #					
		11	Manufacturer	TextBox	Manufacturer					
		16	Notes	TextBox	Notes					
		20	DOCS LINK	Numeric	DOCS LINK					



Mobile Version



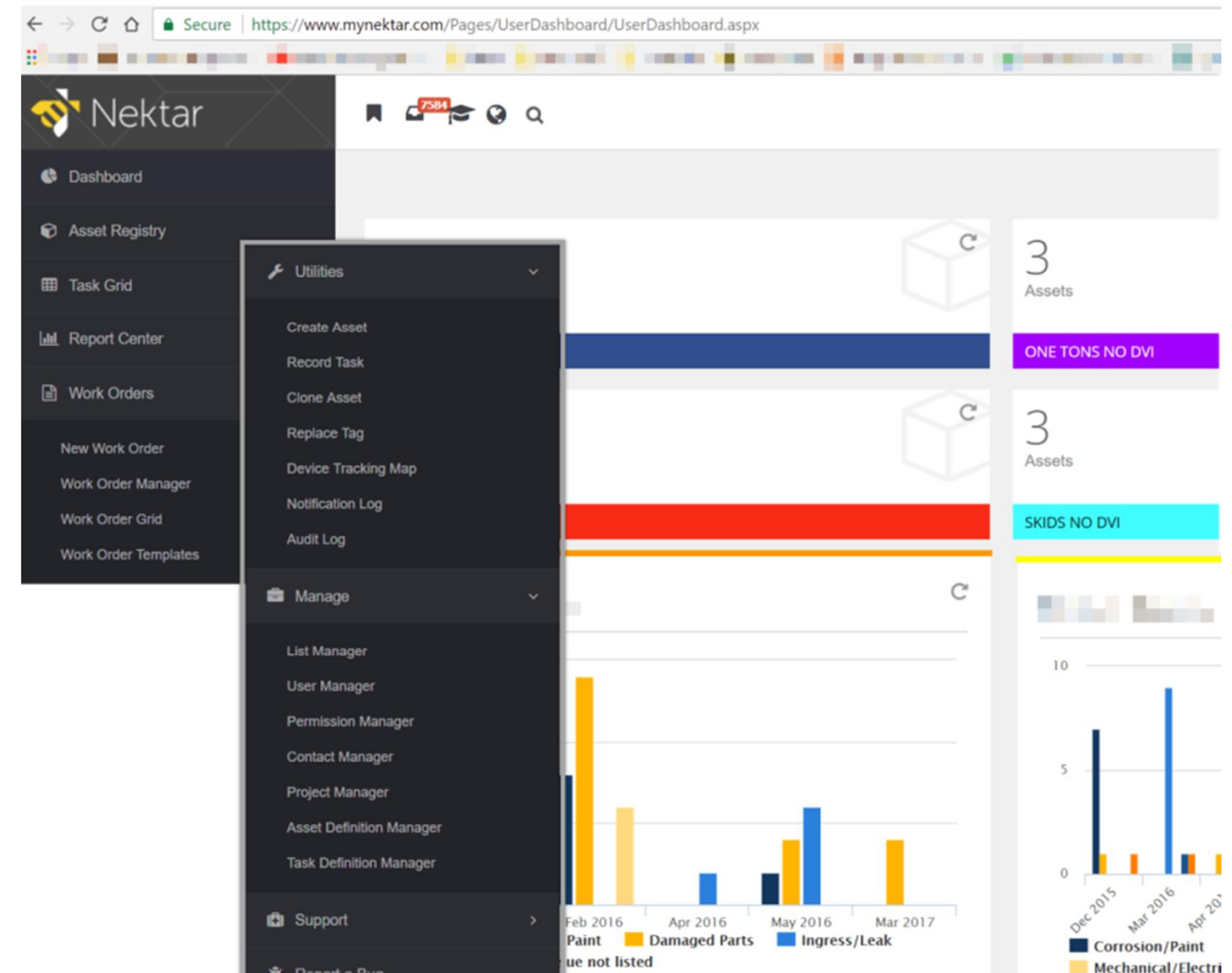
- Apps for both iOS and Android
- Natively developed – not a generic “cross platform” application
- Designed for all form factors (phones, tablets, phablets, etc.)
- Utilization of technology advancements and new platform features (Face ID, 3D Touch, Gestures, etc.)
- Asset creation and event capture all GIS referenced
- Frequently updated to incorporate new product features and bug fixes



Web Version



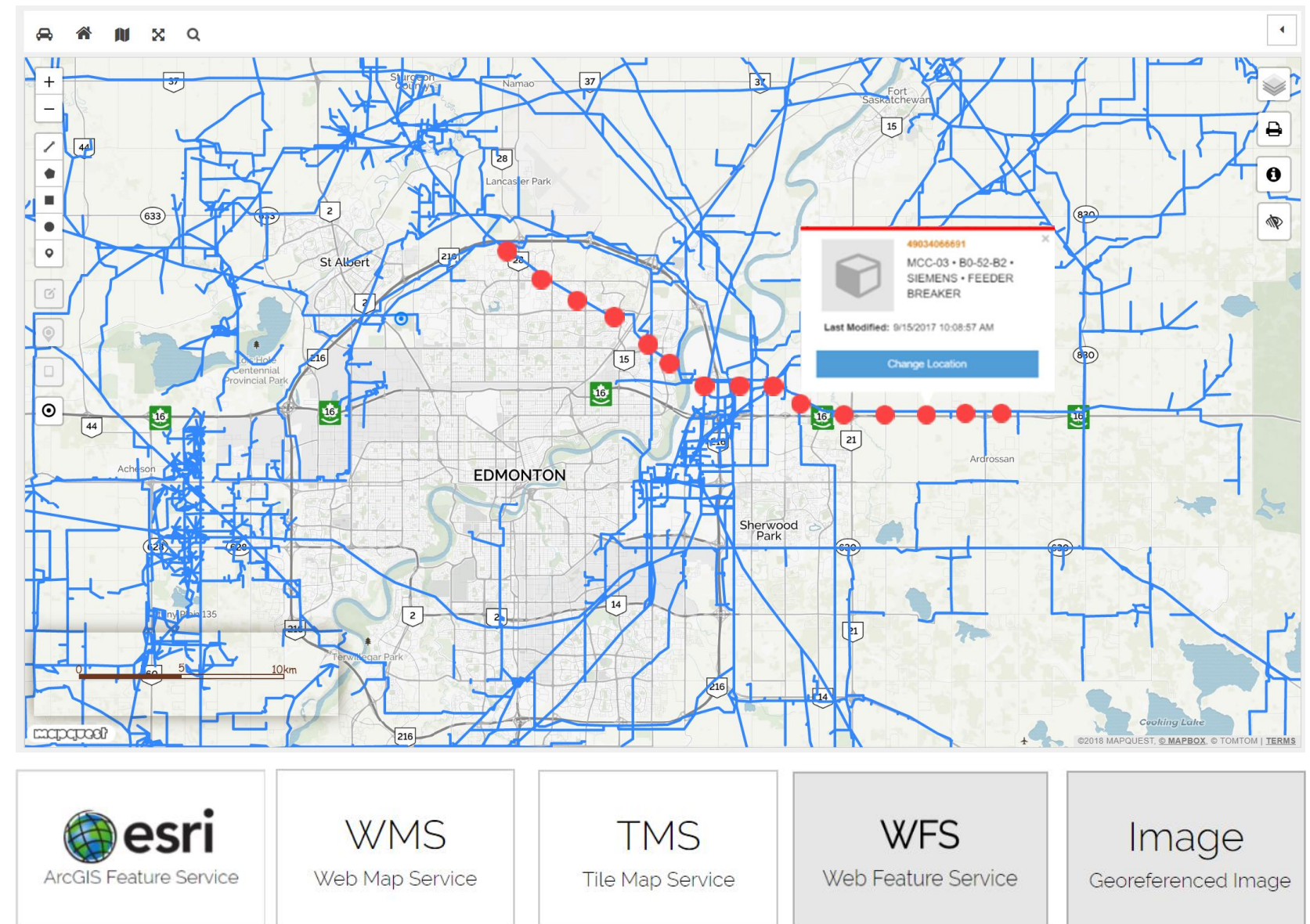
- Browser based, no cookies no downloads no risk
- User interface to create asset registry and data collection definitions
- Data presentation for asset, event or work order data dashboards
- Dataset configuration and report builder
- Audit log interface
- Robust permissions management console
- Mapping integration tools
- Automations and notifications processes



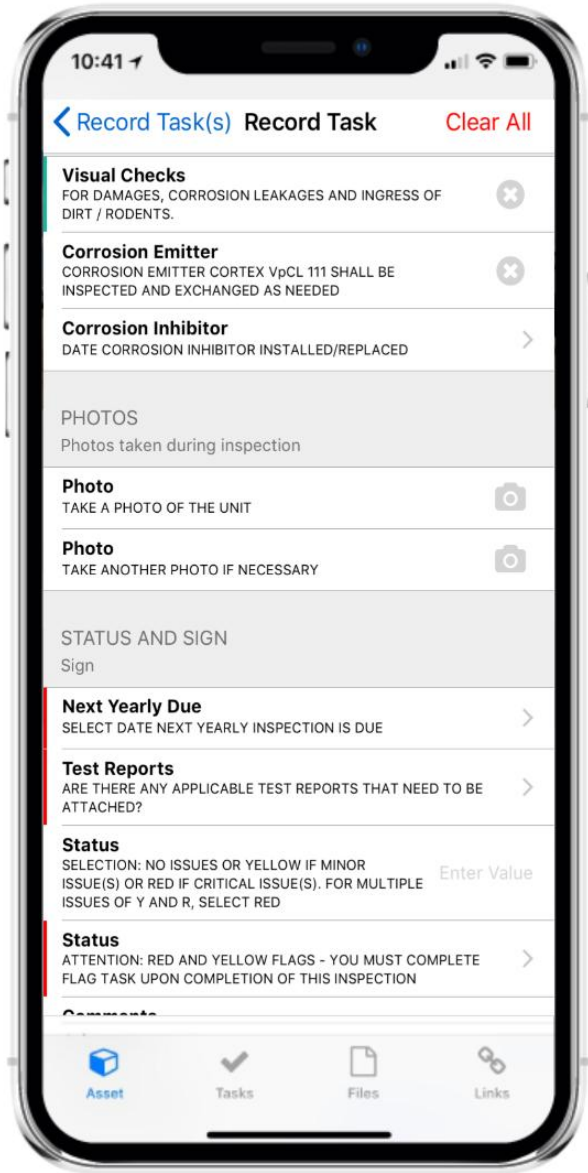
GIS Asset Mapping



- Native mapping in field
- GIS feature rich integration
- Create spatial “assets” in field
- GNNS Bluetooth Compatible
- Complete GIS data transfer



Inspection Flexibility



Results



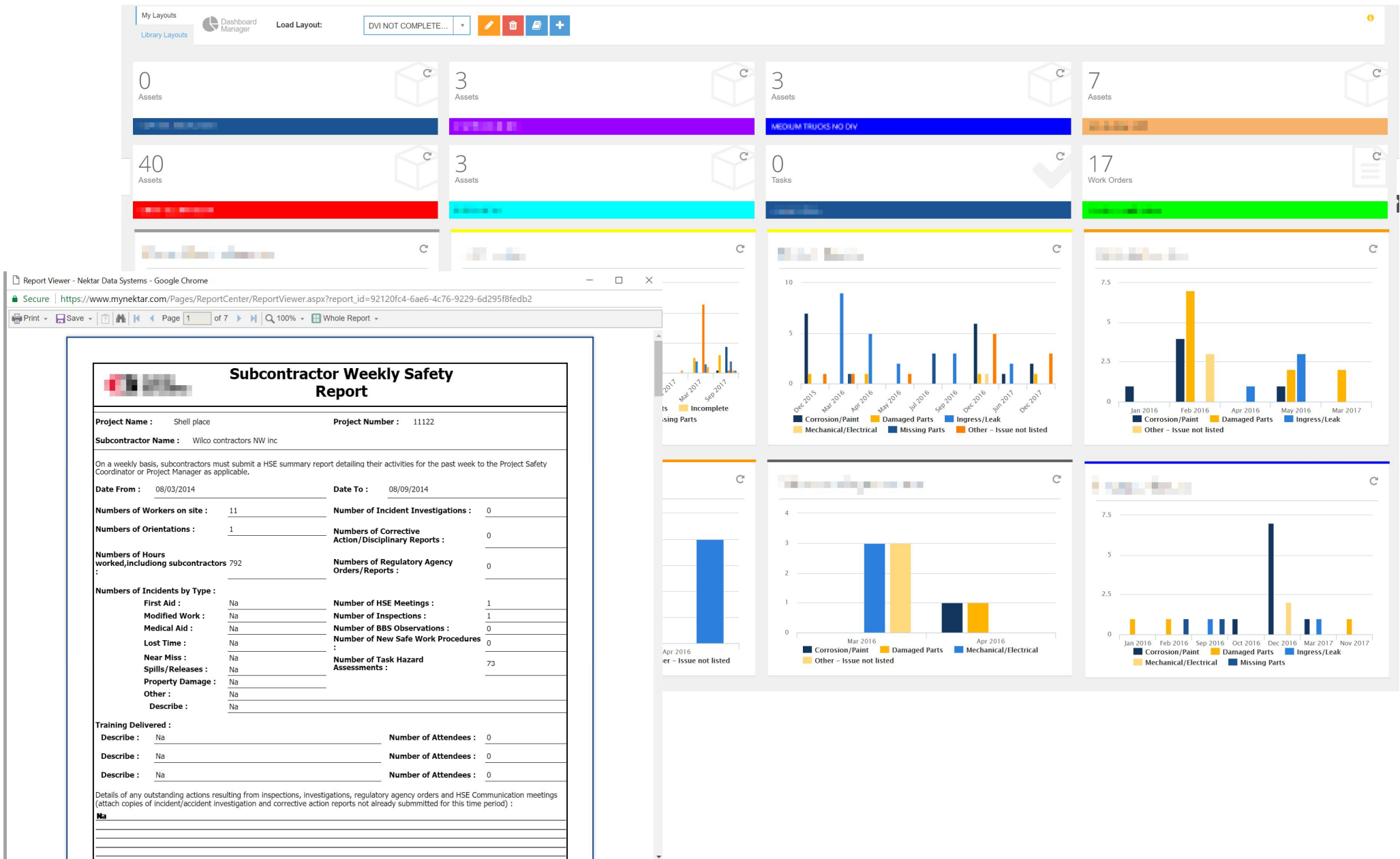
- Traceable, verifiable, and complete records from supply chain to install
- Real-time contractor accountability
- Project awareness
- Trending of asset conditions
- Location based data



Dashboards and Reports



- Endless iteration of customized or personal dashboards showing work or asset status
- Custom report generation and data analysis



Data, Documents and Links Access



- Synchronized document storage on a per assets basis
- Links from asset to storage vaults or video help systems

File Manager - Google Chrome

Secure | https://www.myequipdata.com/DesktopModules/FileManager/FileManager.aspx?asset_id=9e6349ad-238a-4d33-9fd9-ec2385fc24c4

75110800116

Motor • 3002576003-90 • 6.9KV 3 phase, 60HZ, 6500HP, 1800RPM Motor

+

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75110800116

Oil Guard Measurement Checks

Oil Seal Inspection Pics

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Name	Size	Last Modified
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File Manager - Google Chrome

Secure | https://www.myequipdata.com/DesktopModules/FileManager/FileManager.aspx?asset_id=9e6349ad-238a-4d33-9fd9-ec2385fc24c4

File Preview: 126-FXVLY-B2-MPM-02.pdf

Measuring Motor Oil Guard of Motors in Storage

Customer Ref. No.:

Revision No.: 0

Page No.: 7(8)

APPENDIX B – MEASUREMENT CHECKS

MOTOR S/N	3002576003-090				
TAG NUMBER					
	Feeler Gauge	Laby #1 Mic	Laby #2 Mic	Laby #3 Mic	Laby #4 Mic
DE (inboard)					
12:00 (Pos#1)	.007	7.0160	7.0158	7.0160	7.0162
2:45 (Pos#2)	.005	7.0159	7.0161	7.0160	7.0163
3:15 (Pos#3)	.005	7.0158	7.0158	7.0161	7.0164
6:00	.005				
8:45	.005				
9:15	.005				
DE (outboard)					
12:00 (Pos#1)	.008	7.0160	7.0162	7.0161	
2:45 (Pos#2)	.004	7.0161	7.0162	7.0161	
3:15 (Pos#3)	.004	7.0160	7.0160	7.0162	
6:00	.004				
8:45	.004				
9:15	.004				

Page 1 / 1

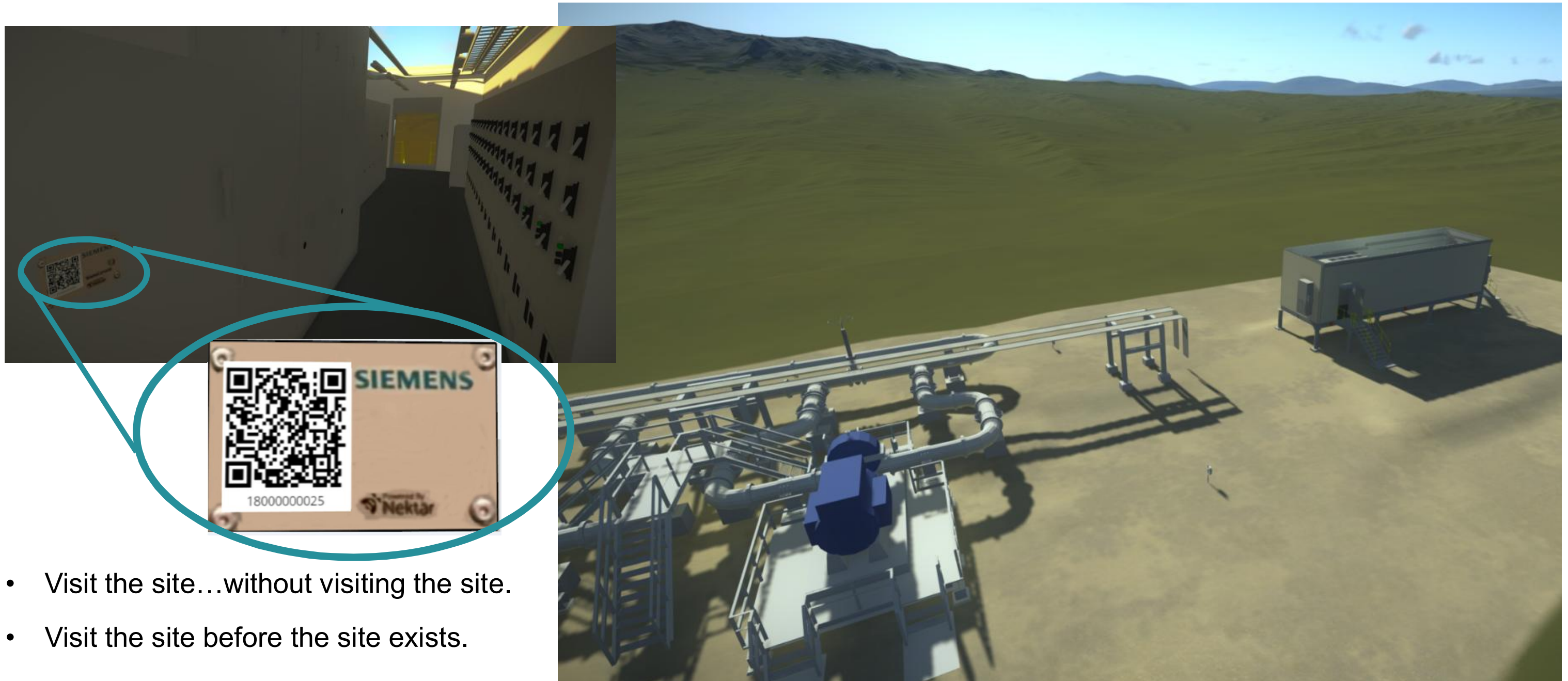
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Close

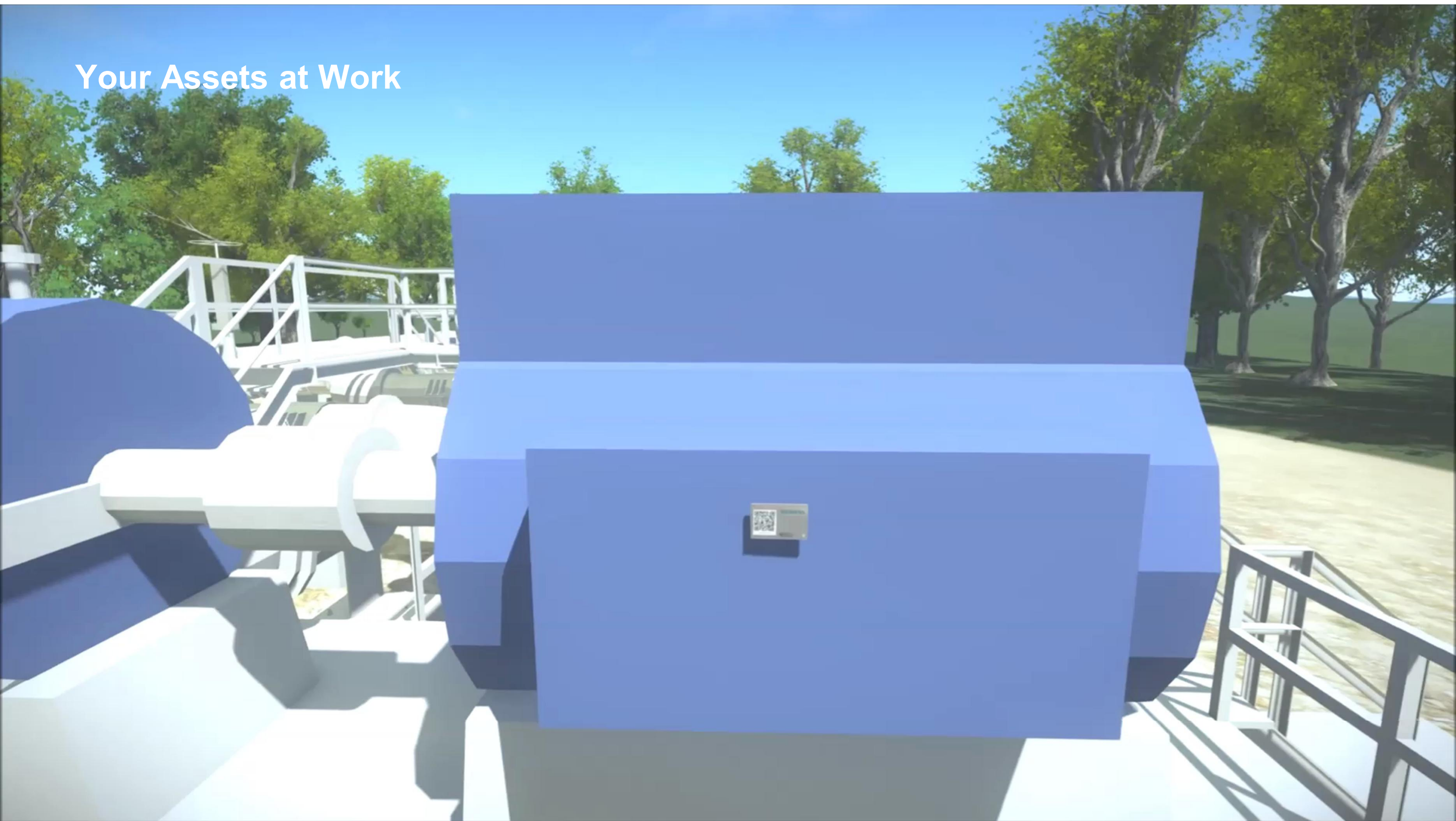


Asset Management in the Virtual World



- Visit the site...without visiting the site.
- Visit the site before the site exists.

Your Assets at Work



Networked Hydrocarbon Detection

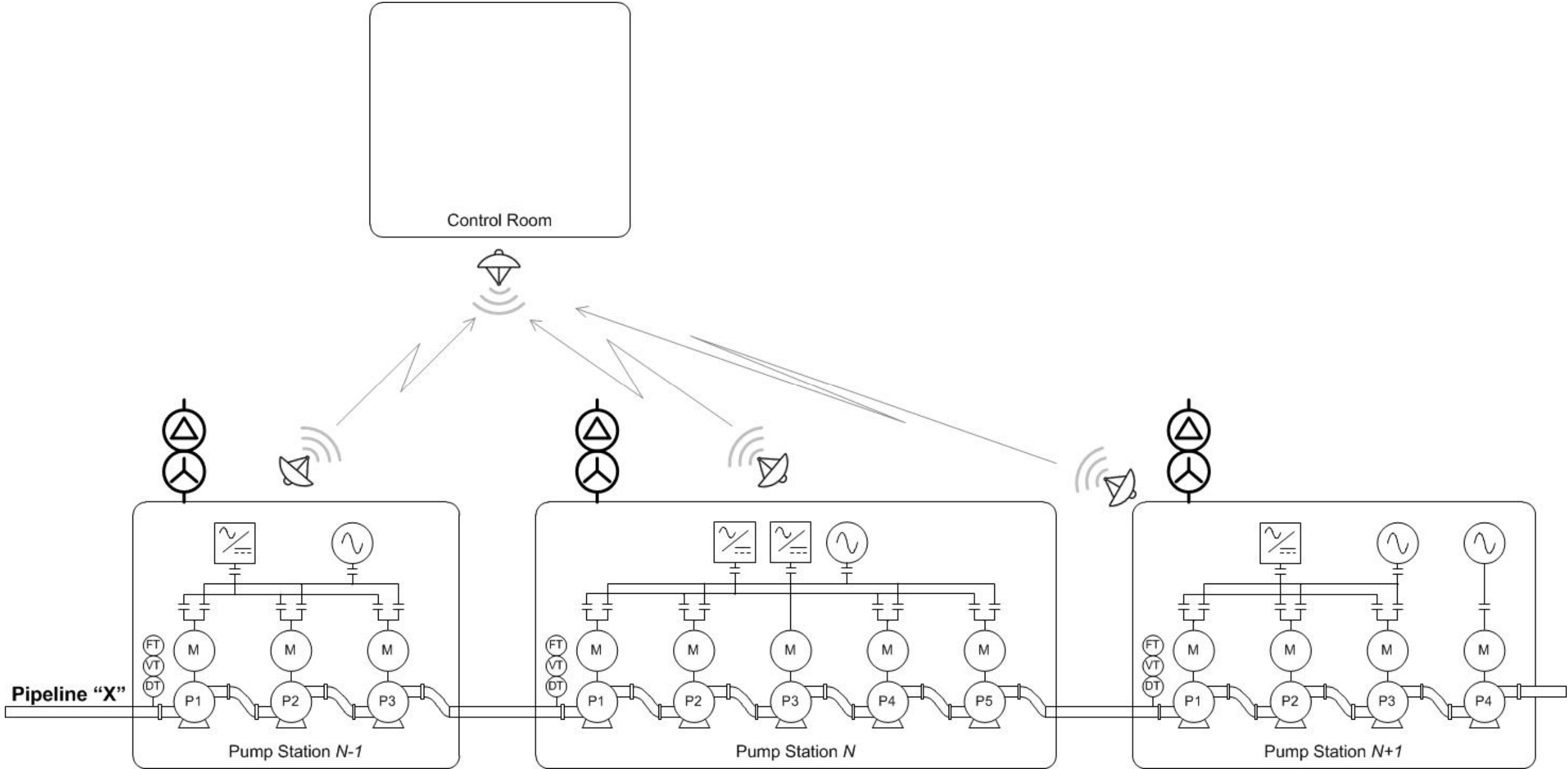


- Leak detection sensor and communication system for existing pipelines
- Off pipe; easy retrieval of sensors for regular maintenance
- Economical; pipeline excavation not required
- Direct detection within +/- 10 meters
- Suitable for high consequence areas (water crossings or urban areas)
- 24/7 remote monitoring, response within one minute of oil detection

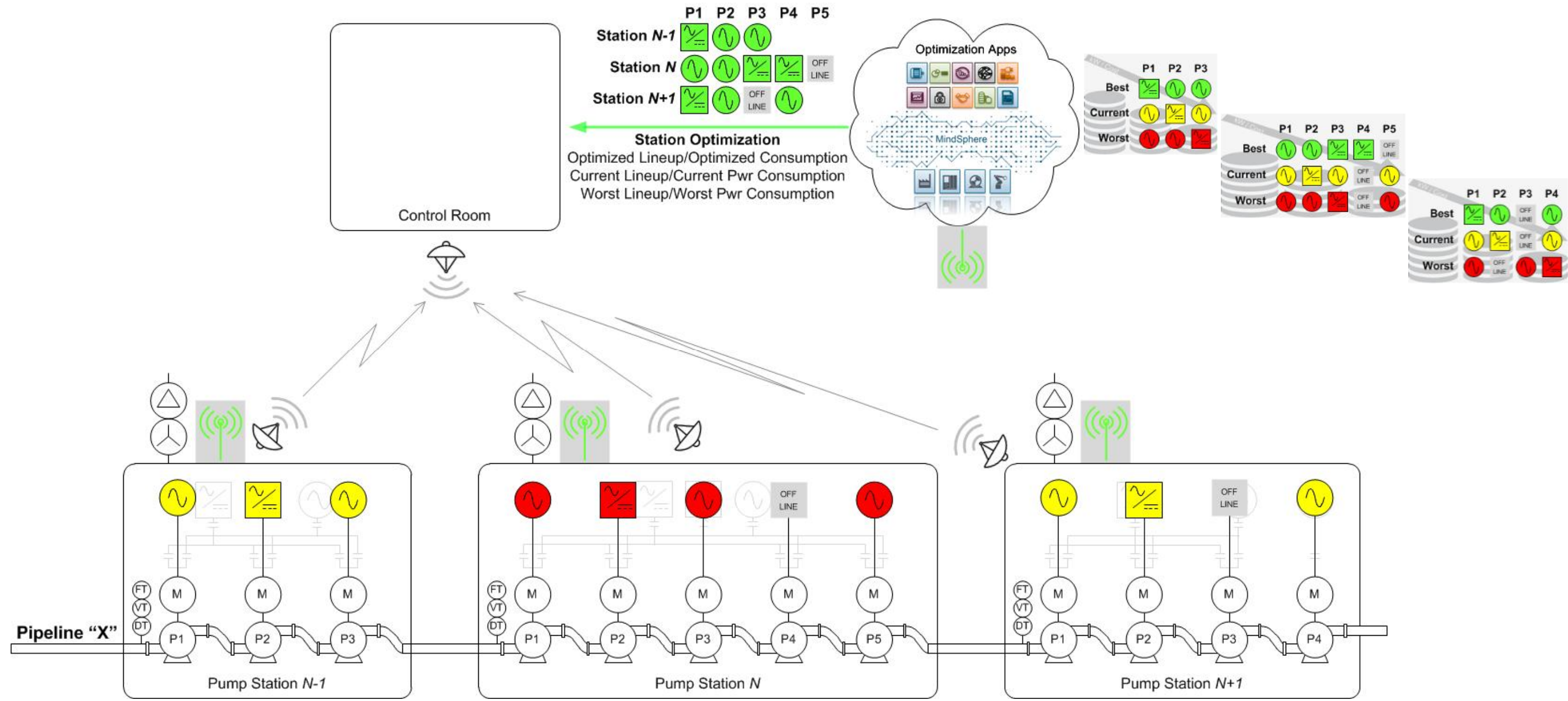


Layers of Smart Pumping

Existing (or new) Pipeline “X”

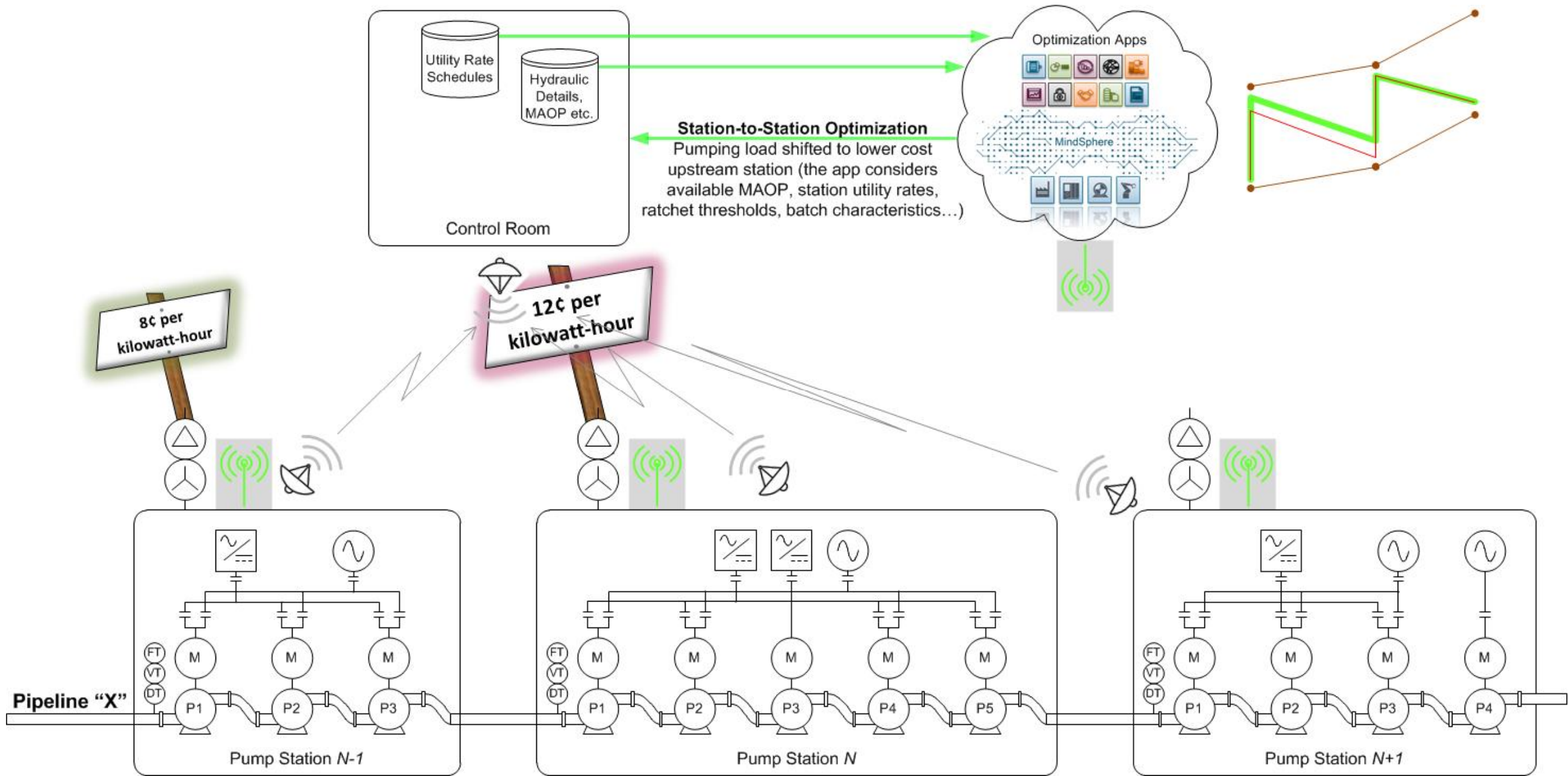


Layers of Smart Pumping Pump Station Optimization



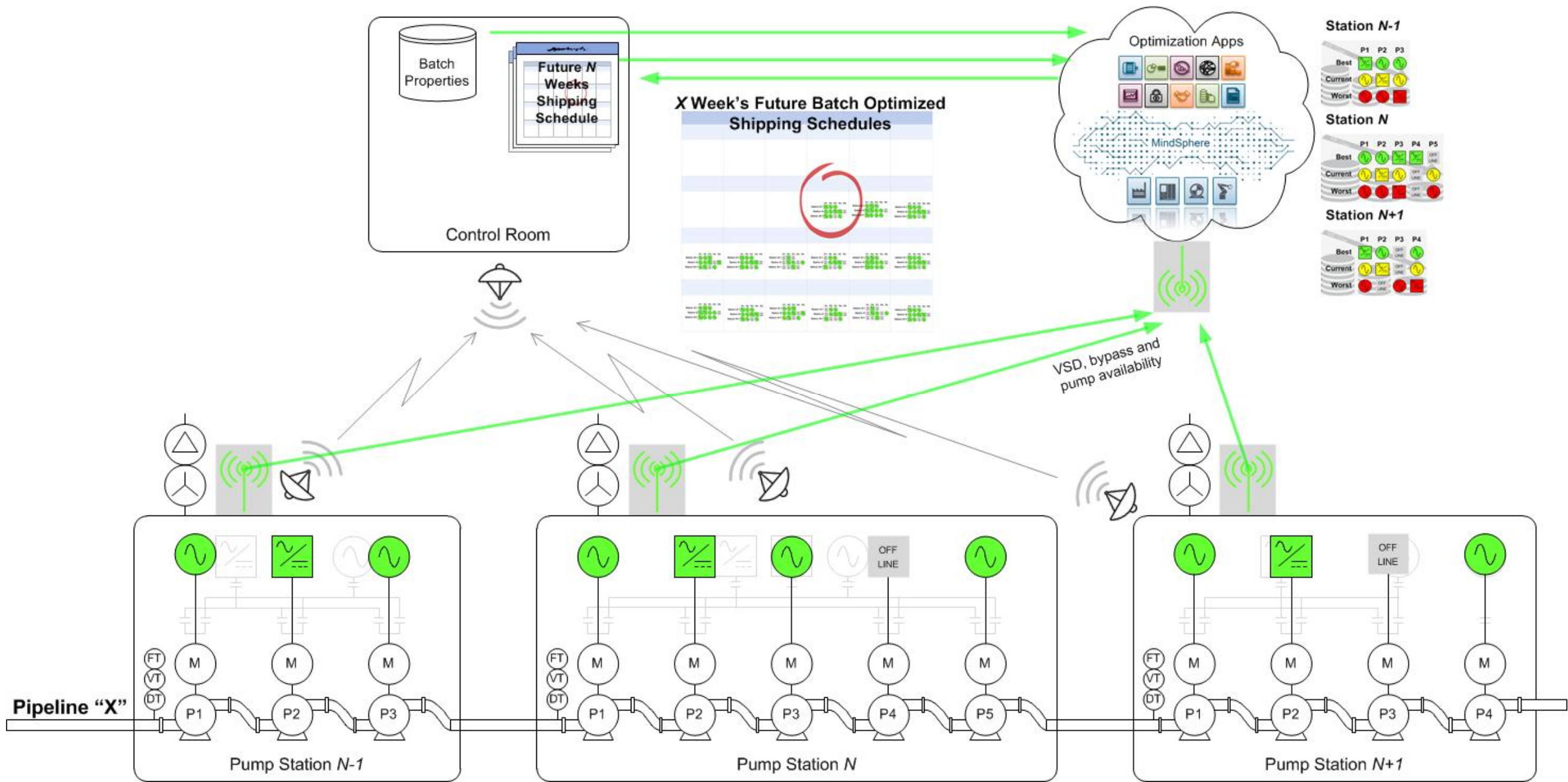
Layers of Smart Pumping

Station-to-Station Utility Price Differential Optimization



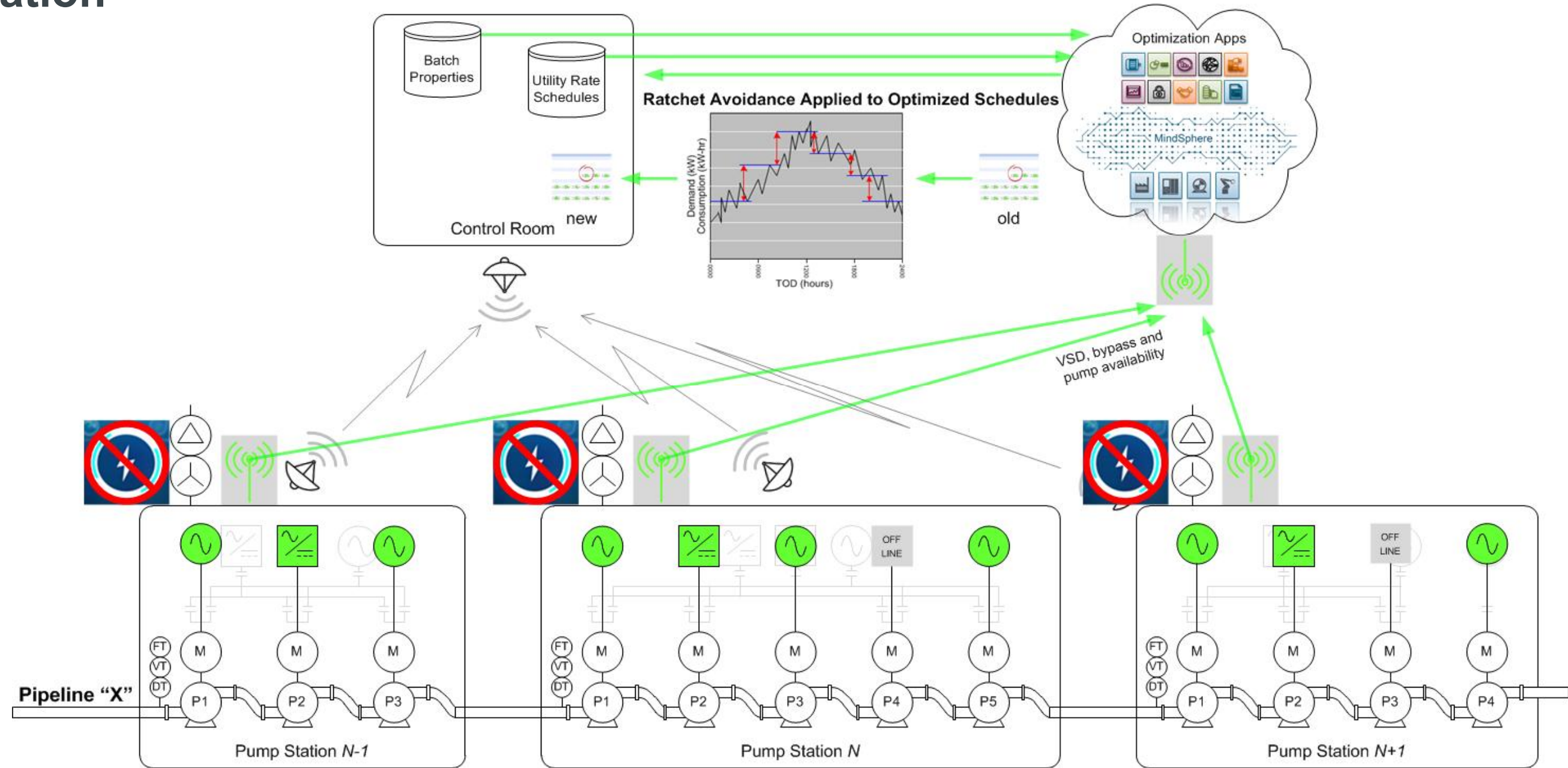
Layers of Smart Pumping

N Week Station Optimized Batch Scheduling



Layers of Smart Pumping

Utility Ratchet Penalty Avoidance – Single Substation, Single Pump Station



Integrated Pump Station Packages



MINDSPHERE INTEGRATION

ASSET CLARITY

HUMAN-TO-MACHINE ASSET MANAGEMENT

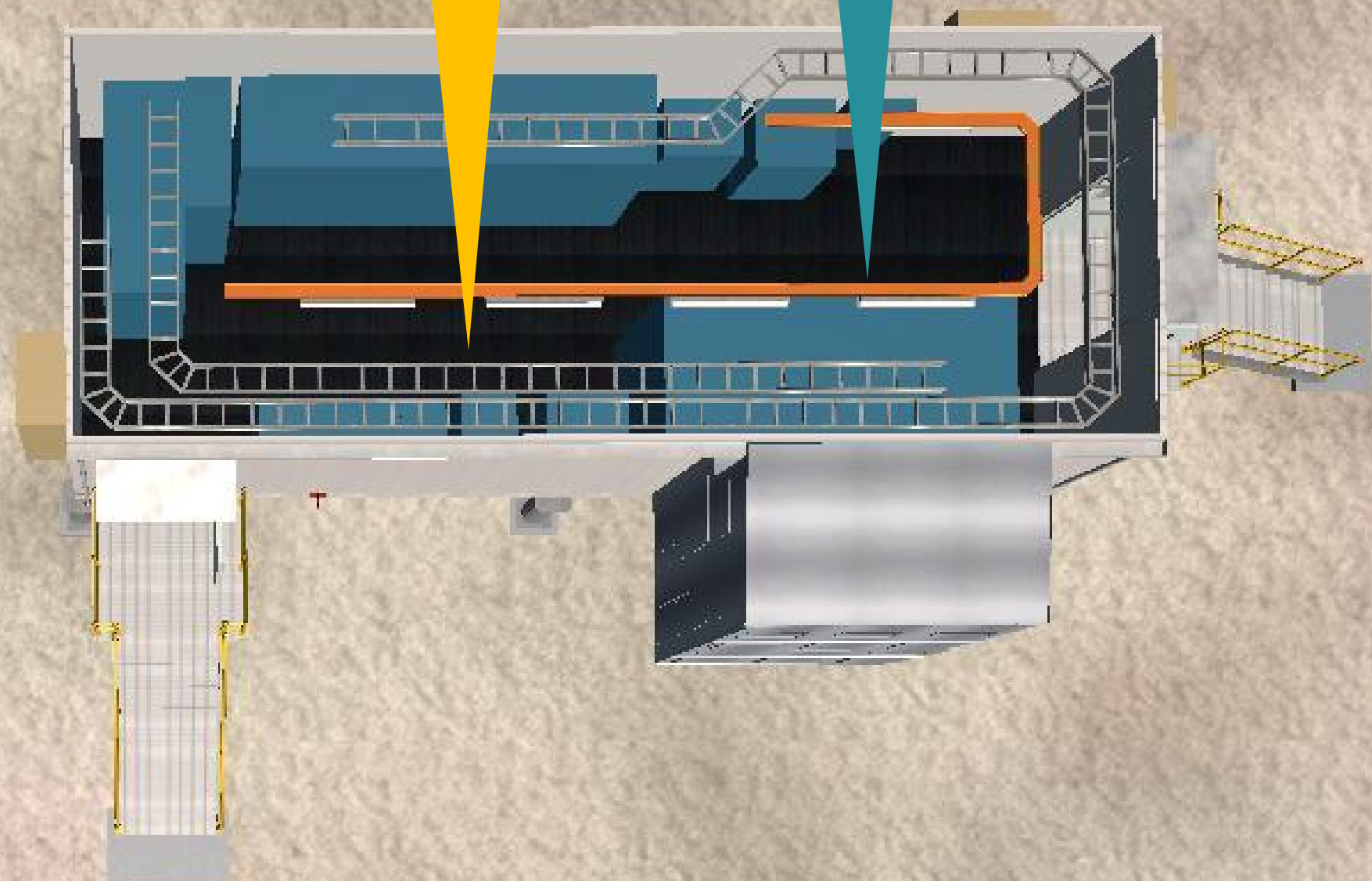
- Execution
- Life Cycle
- Incorporate Event Triggered Components such as Leak Detection

MACHINE-TO-MACHINE

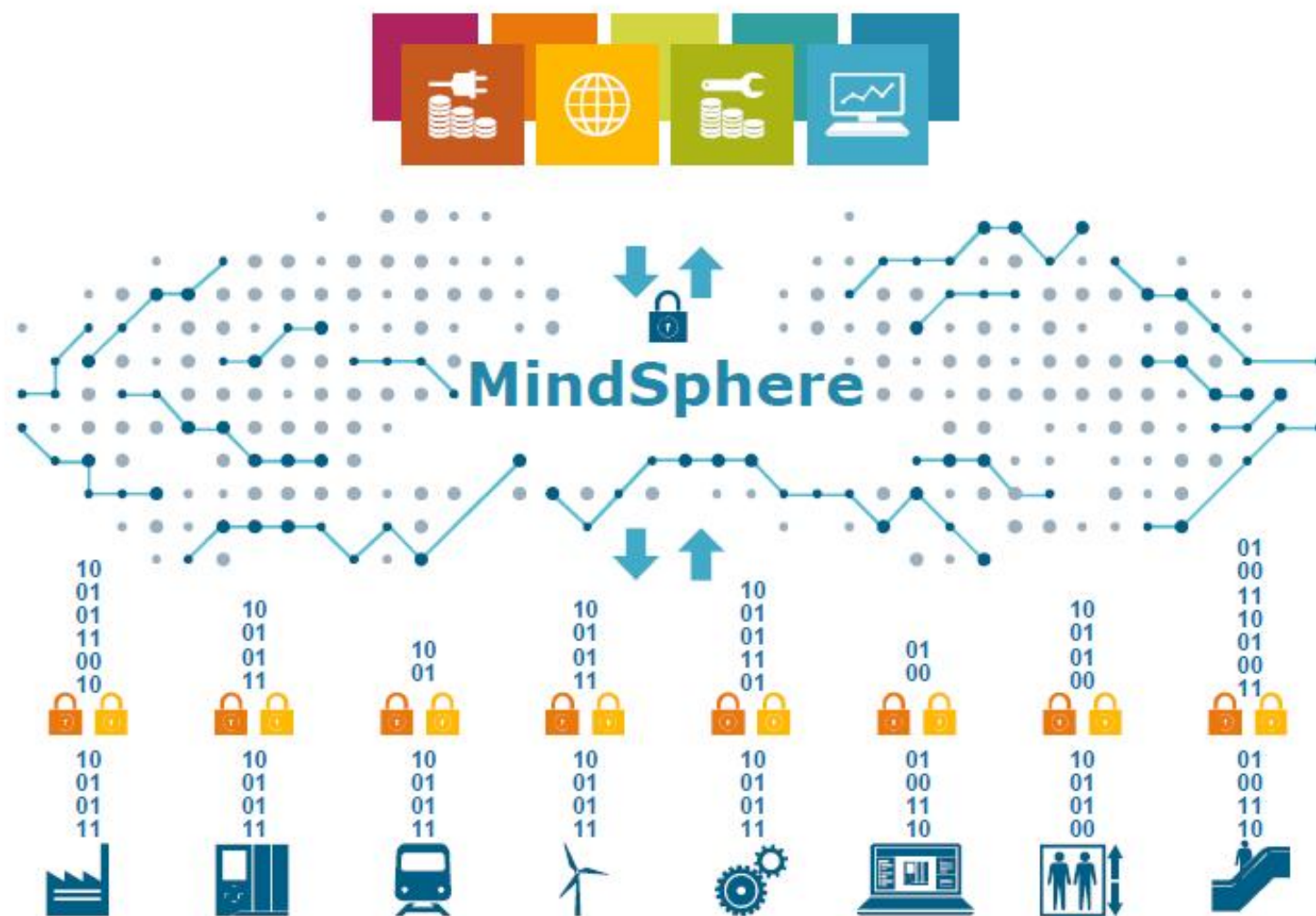
- SMART PUMPING
- Drive Train Analytics

DIGITAL PUMPSTATION

- Asset Clarity w/NEKTAR integration into MINDSPHERE
- MINDSHPERE Applications
- SMART PUMPING
- Drive Train Analytics



MINDSPHERE – Cloud Based Open IoT Operating System



MindApps

- Use apps from Siemens, partners or develop own apps
- Gain asset transparency & analytical insights
- Subscription based pricing model

MindSphere

- Open interface for development of customer specific apps
- Various cloud infrastructures: SAP, AWS, Microsoft Azure offered as public, private or on-premise (planned)

MindConnect

- Open standards for connectivity, e.g., OPC UA
- Plug and play connection of Siemens and 3rd party products
- Secure and encrypted data communication

An aerial photograph of a large-scale construction project. A prominent red lattice boom crane is positioned on the right side of the site, lifting a long, white, corrugated metal beam. The construction area is filled with various materials, including stacks of lumber and concrete blocks. Several workers in high-visibility vests are visible on the ground. In the background, there's a dense line of trees and a power line tower. The overall scene depicts an active industrial or infrastructure construction site.

**Questions?
Thank you.**

SOGIC 2018