



# TECHNOLOGY OVERVIEW

5.15.25 Drew Seward Bill Sampson

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## SAFETY MOMENT

# Safe Driving Tips



**Don't drive** if you feel tired, lightheaded or stressed. And always wear your seatbelt.



**Remove distractions** in the vehicle. The use of devices, conversations with passengers and eating can all divert a driver's attention.



**Increase the awareness** of your surroundings by frequently checking mirrors, particularly while changing lanes.



**Verify you are driving** at the correct speed limit. Keep a safe distance from the car ahead of you to allow time to brake safely.



**Exercise caution** when emergency vehicles approach. They have the right of way. Watch for flashing lights and listen for sirens.

# SAFETY ALWAYS MATTERS



## Safety Management System

### Key Initiatives:

- + Safety training delivered through SAM University
- + Safety training at multiple levels of employment
- + Development of a Risk Assessment and Mitigation Planning process
- + Quarterly safety committee meetings
- + Creation of a Risk Management team
- + Detailed incident review and corrective/preventive actions program
- + Employee safety recognition programs

### Digital JHA Program:

- + Instantly view and share JHA submissions
- + See photos of the work locations and conditions
- + Build-in micro-training and policy reminders
- + Reduce the “compliance burden”
- + Improves efficiency and participation
- + Provide feedback through JHA review and scoring
- + Set up auto alerts
- + Reduces delays in the feedback loop
- + Track performance, identify trends and adjust resources

## JHA Submittal Tracking





# SAM BY THE NUMBERS

## COMPANY PROFILE

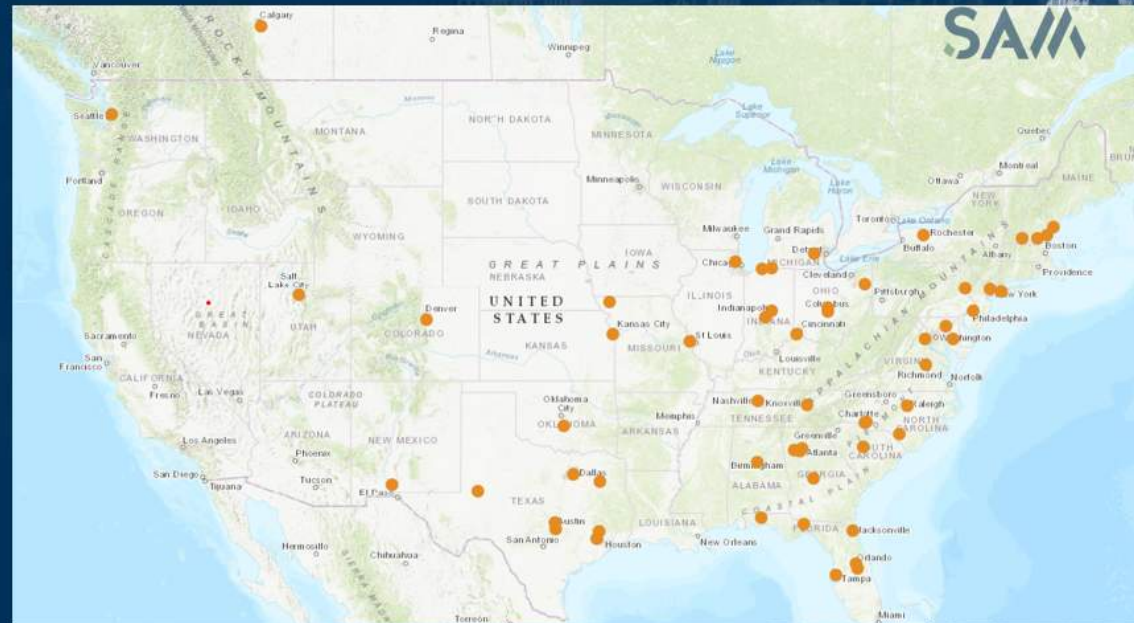
**50+**  
Offices in U.S.

**1,700+**  
employees

Business  
Licenses in  
**50**  
States

**574**  
Licensed  
Surveyors &  
Professional  
Engineers

SAM is the most technically advanced professional Geospatial and Inspection solutions firm in North America, providing intelligent spatial data for decision support serving utilities, transportation, and infrastructure-focused clients.



People / Safety / Excellence in Service / Integrity & Ethics / Community

# SAM BY THE NUMBERS



## Mid-Atlantic Region Profile

3

Offices in Ohio

4

Offices in Indiana

1

Office in Michigan

1

Office in Kentucky

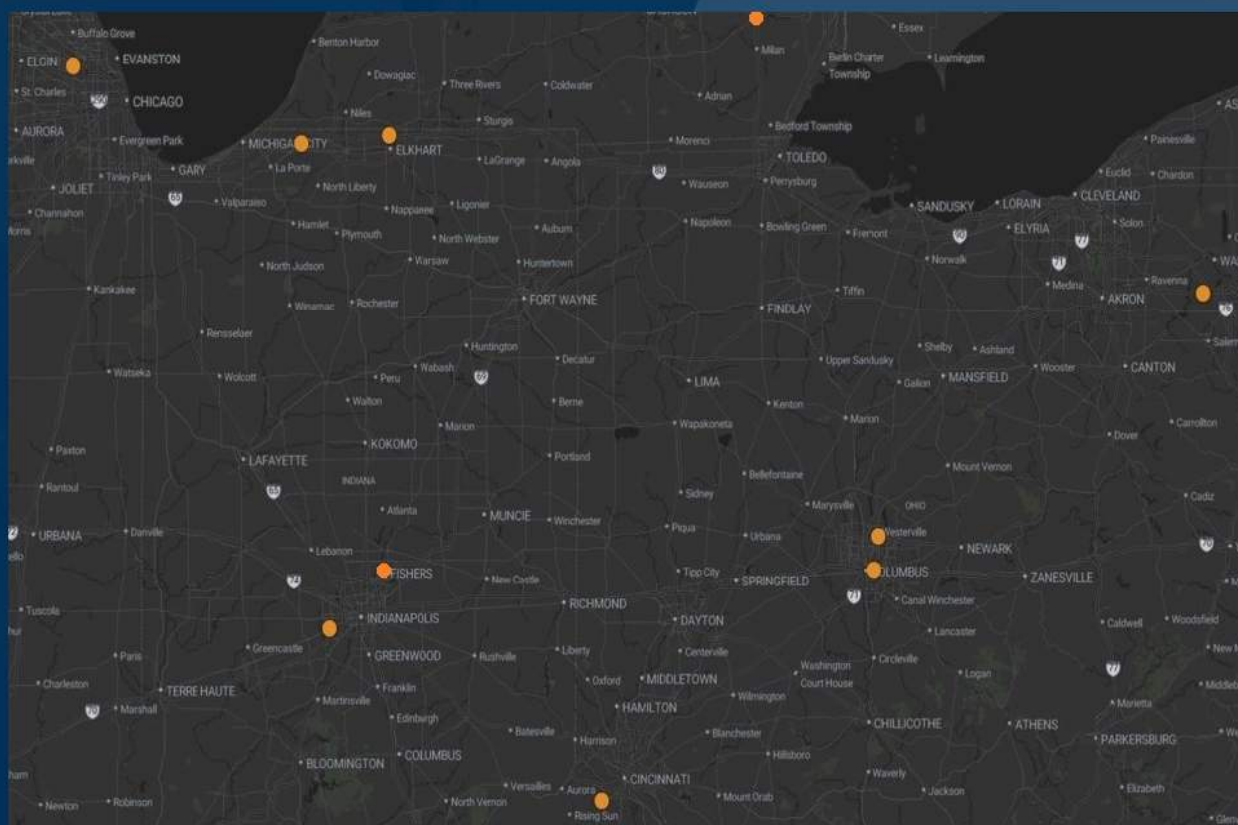
Field Crews

35+

SUE/Survey

20+

Project Managers



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# CORE MARKETS



01



## UTILITIES

- + ELECTRIC
- + GAS DISTRIBUTION
- + RENEWABLES
- + TELECOMMS
- + WATER

02



## TRANSPORTATION

- + AVIATION
- + HIGHWAYS
- + PORTS
- + RAIL

03



## GOVERNMENT

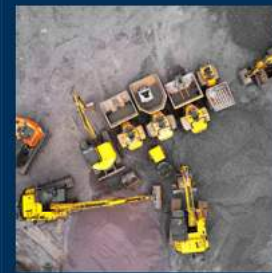
- + FEDERAL
- + LOCAL

04



## ENERGY

05



## LAND DEVELOPMENT

06



## ARCHITECTURE

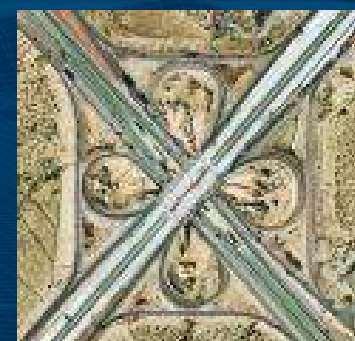


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# WHAT WE DO - OUR SERVICES

- Land and Hydrographic Surveying
- Airborne, Mobile, and Terrestrial LiDAR
- Aerial Mapping
- Asset Inventory
- Electric Inspection
- Vegetation Management
- Emergency Storm Response
- Subsurface Utility Engineering (SUE)
- Utility Coordination
- Geographic Information Systems (GIS)
- Construction Phase Services
- BIM
- 3D Laser Scanning



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# WHY SAM?



//  
**TECHNOLOGY &  
INNOVATION**



//  
**TURNING COMPLEX  
DATA AND ANALYSIS  
INTO PRACTICAL  
DELIVERABLES**



//  
**SPECIALIZED FOCUS  
AND EXPERTISE**



//  
**REACH AND  
SCALE**



//  
**CULTURE OF  
LEARNING,  
INCLUSION, AND  
TECHNICAL  
INNOVATION**



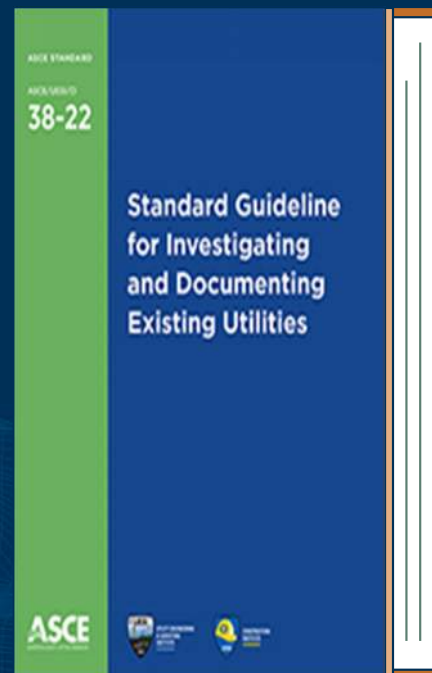
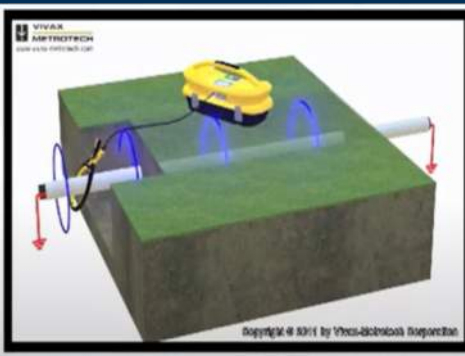
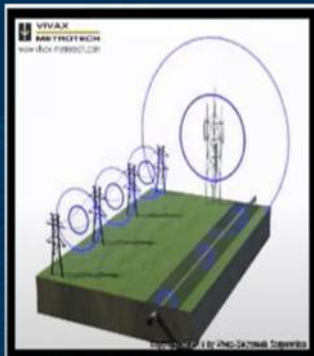
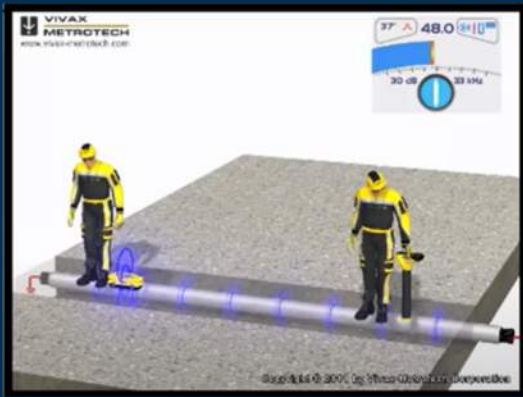
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# SUBSURFACE UTILITY ENGINEERING (SUE) SERVICES



## National Standard

Quality Levels

D, C, B, A

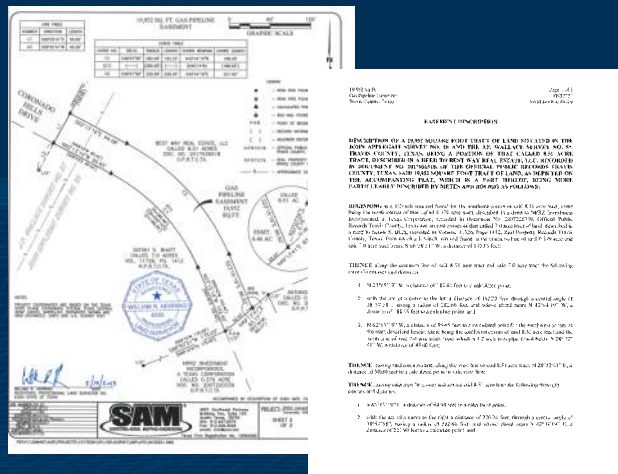
Least Reliable

Most Reliable



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# LAND SURVEYING SERVICES



Control Surveys

Boundary Surveys

Topographic Surveys w/ DTM & TIN

As-Built Surveys

Route Surveys

Right-of-Way Mapping

Final Base Maps

HDS Laser Scanning

Easements/Easement Exhibits

Construction Staking

Hydrographic Surveys



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# BIM SERVICES

- + As-Built Documentation (RapidScan™?)
  - + Virtual Immersive 360 Tour Viewer
  - + SCAN-to-BIM (AEC industry)
  - + ArcGIS GeoBIM
- + Digital Twin Platform that enables the owner to virtually engage with:
  - + Asset Management
  - + Spatial Planning
  - + Facility Management
  - + Risk Mitigation
  - + Health & Safety
  - + Training
  - + Sustainability
  - + Factory Floor Planning



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# SCAN-TO-BIM SOLUTIONS

"Scan to BIM" is a high-speed process for creating accurate 3D Building Information Models (BIM) of existing buildings or infrastructure:

- + **Scanning:** High-tech tools capture precise measurements and details.
- + **Point Cloud Generation:** Data is converted into a 3D point cloud.
- + **Modeling:** Software turns the point cloud into a detailed 3D BIM model in Autodesk Revit
- + **Analysis and Visualization:** The model is used for renovation, clash detection, energy analysis, etc.

**Benefits: Saves Time, Reduces Design & Construction Errors and Aides in Renovation Projects**

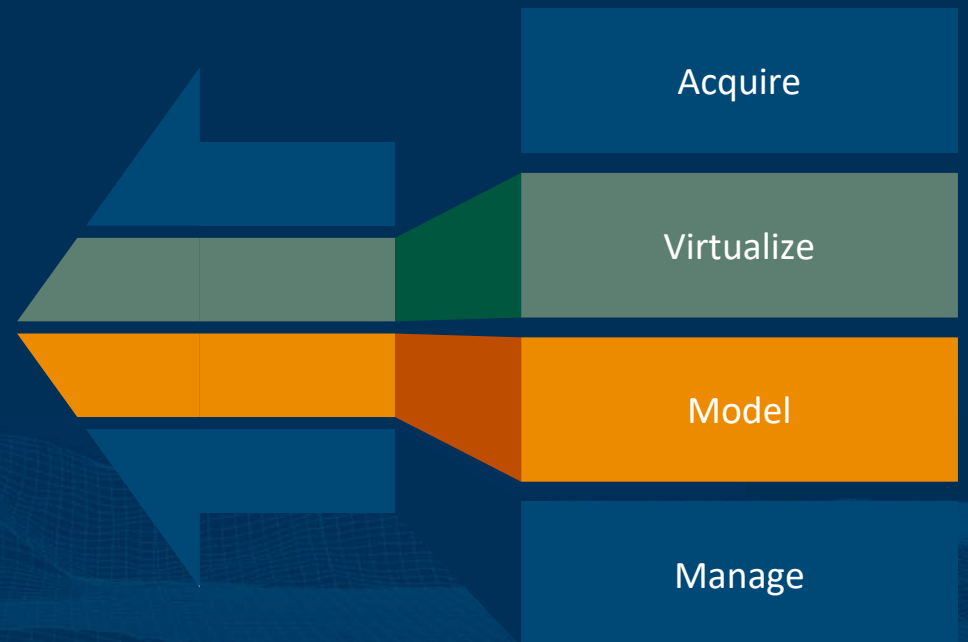


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# SCAN-TO-BIM 4 STEP PROCESS

“SAM delivers turnkey 3D Building Digital Twin solutions and actionable data that empowers you to accurately and efficiently design, document, build and manage your building assets & infrastructure.”



# ACQUIRE

- Laser scanning significantly increases efficiency and reduces downtime by rapidly capturing vast amounts of accurate data.
- The enhanced accuracy and detail from millions of captured data points provide a comprehensive and precise 3D representation of existing conditions.
- Resulting point clouds and 3D models improve collaboration and communication by offering a clear visual reference for all stakeholders.
- Cost savings and reduced risk are achieved through accurate as-built documentation and early identification of potential clashes or issues.
- Laser scans deliver comprehensive documentation and facilitate efficient asset management with a permanent and detailed record of existing conditions

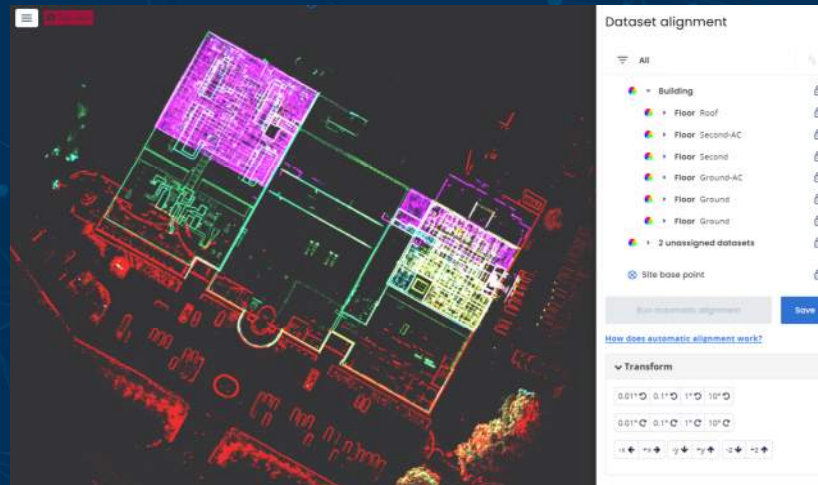
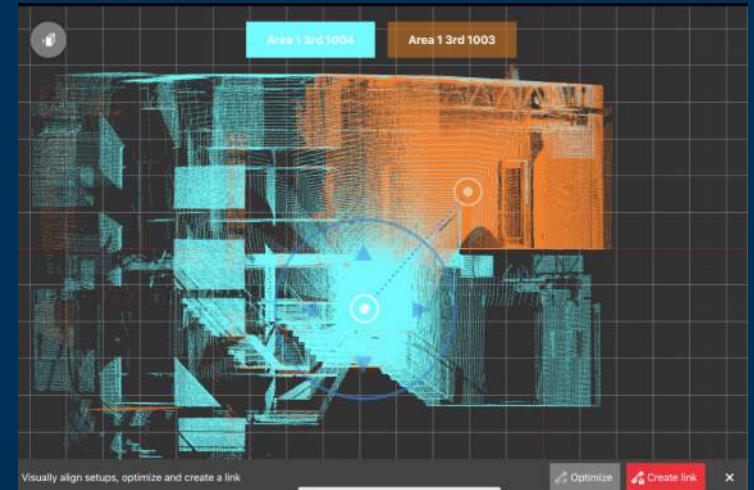




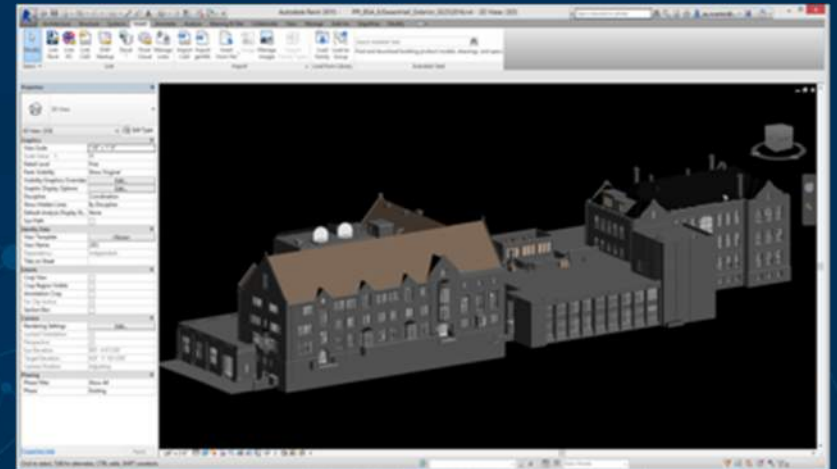
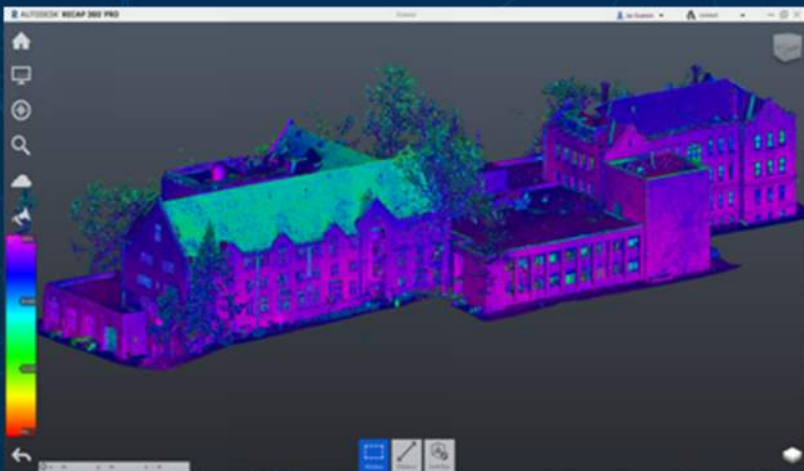


# VIRTUALIZE

- + Captured scan data is processed in cloud servers
- + Scanned data sets merged into a point cloud
- + Checked for accuracy & dimensional tolerance



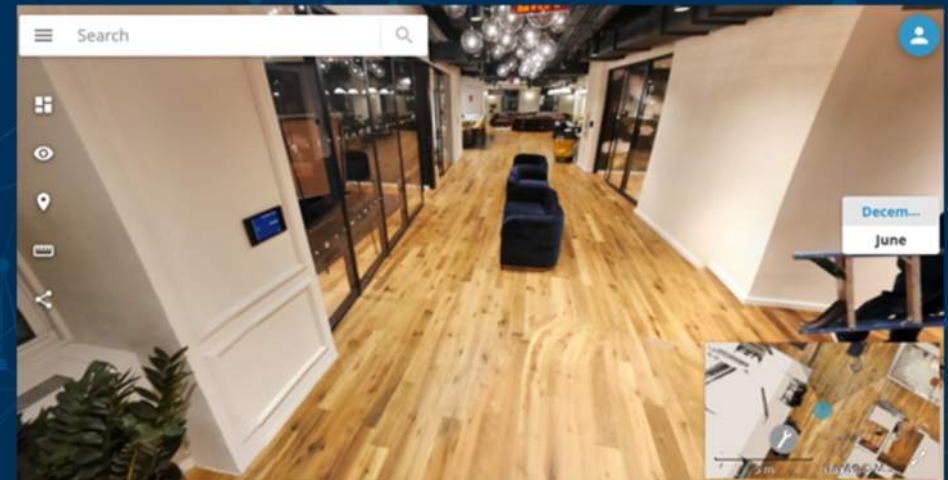
# MODEL





# MANAGE

- + SAM Offers 2 Options for Managed Services
  - + NavVis Ivion
  - + Cintoo
- + 360 Images are accessible on a SAM Managed server
- + Enterprise grade security
- + Allows for virtual project collaboration
- + Instant point & click measurements
- + Point of Interest (POI)



# WHAT IS A DIGITAL TWIN

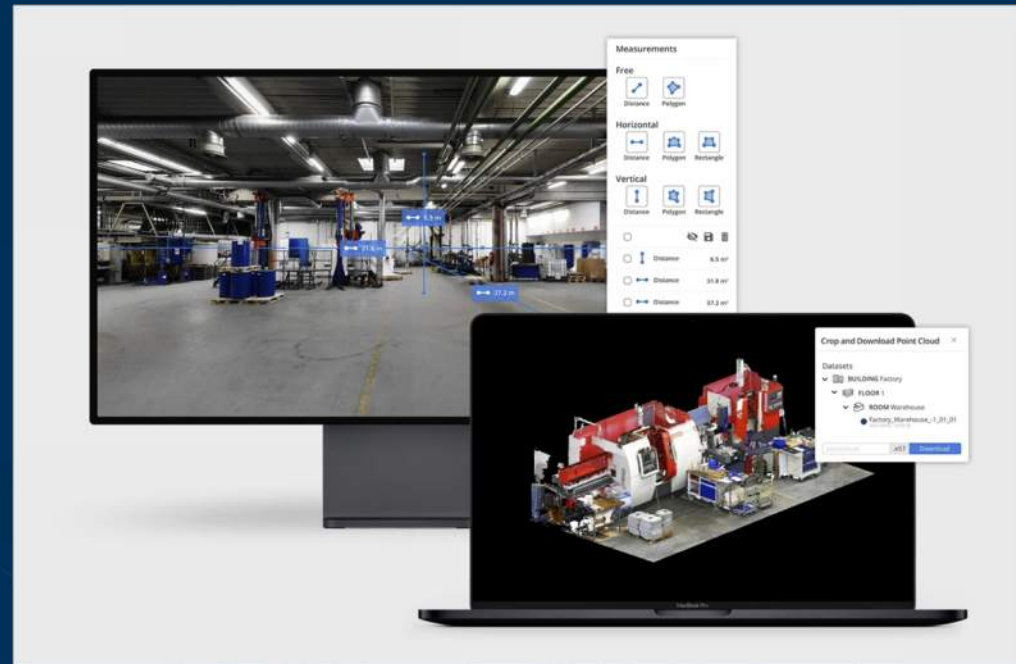
*"A digital twin is a virtual, dimensionally accurate representation of a physical building, created using digital technologies such as 3D laser scanning, 360 immersive imagery, Building Information Modeling (BIM), Internet of Things (IoT) sensors, and other data sources. It is continually updated with real-time data and utilizes simulation and machine learning to aid in decision-making."*

*The global digital twin market size was valued at USD 12.91 billion in 2023. The market is projected to grow from USD 17.73 billion in 2024 to USD 259.32 billion by 2032, exhibiting a CAGR of 39.8% during the forecast period.*

*Fortune Business insights*



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**+ MGSS will be a flexible technology agnostic managed platform to support Digital Twins**



# GEO-BIM

Esri GeoBIM is a system that integrates GIS and BIM technologies to enable better collaboration, data management, and decision-making throughout the lifecycle of a building or infrastructure project:

- + **Integration:** Combines GIS and BIM for seamless collaboration.
- + **Collaboration:** Facilitates teamwork among stakeholders.
- + **Geospatial Intelligence:** Tracks assets from construction to maintenance.
- + **Cost savings:** Reduces errors and streamlines workflows





# WEARABLE MOBILE MAPPING – RAPIDSCAN™

Capture Indoor environments at the speed of walking with panoramic images and 3D point clouds

- + Indoor digitization at scale – 10x faster than static scanning (tripod)
- + Scan the environment with the integrated laser scanners (LiDAR) at a range of 100 ft
- + Create perfect 3D digital twin environments
- + Capture high resolution panoramic images for a brilliant visual quality
- + Capture up to 150,000SF per day on average
- + SAM has 4 systems
- + NavVis Highest Manufacturing Certification



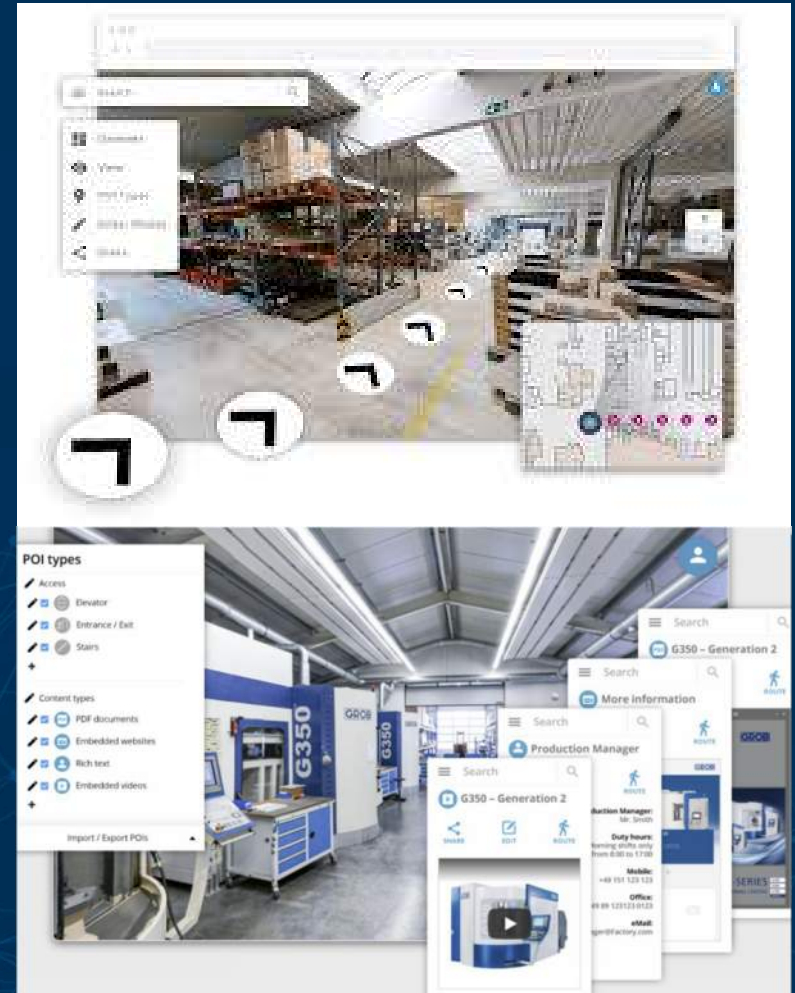


# IMMERSIVE DIGITAL TWIN VIEWERS

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# MGSS PLATFORM: IVION *(POWERED BY NAVVIS)*

- + Cloud based subscription service
- + 360 Panoramic Immersive Imagery for visual inspection
- + Google Streetview of your facility
- + Accurate Survey Grade measurements from georeferenced image
- + Powerful built-in POI creation
- + Open API for customization & integration w/MGSS



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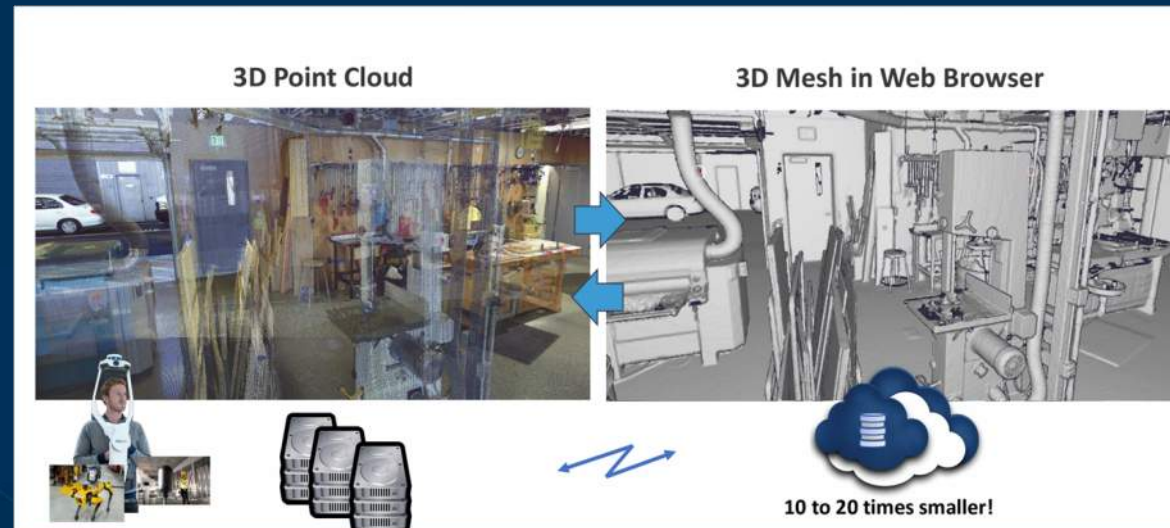
# MGSS PLATFORM: CINTOO

Enables scanned as-builts into cloud-based, collaborative workflows using BIM, CAD and Digital Twins

- + Point Cloud to Mesh in the Cloud
- + 10-20x smaller size files
- + Makes scans cloud compatible for stakeholder
- + White box labeled
- + Scanner agnostic
- + Scalable
- + Flexible – AWS or Azure
- + BIM Model Development



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# MGGS PLATFORM: PREVU3D

Leverage reality capture data for rapid engineering design and project collaboration

- + Convert point cloud to photorealistic “mesh” model
- + Virtual Factory Layout
- + Asset inventory Management
- + Facility Management
- + Training
- + Facility Maintenance
- + Virtual Tours





# USE CASES

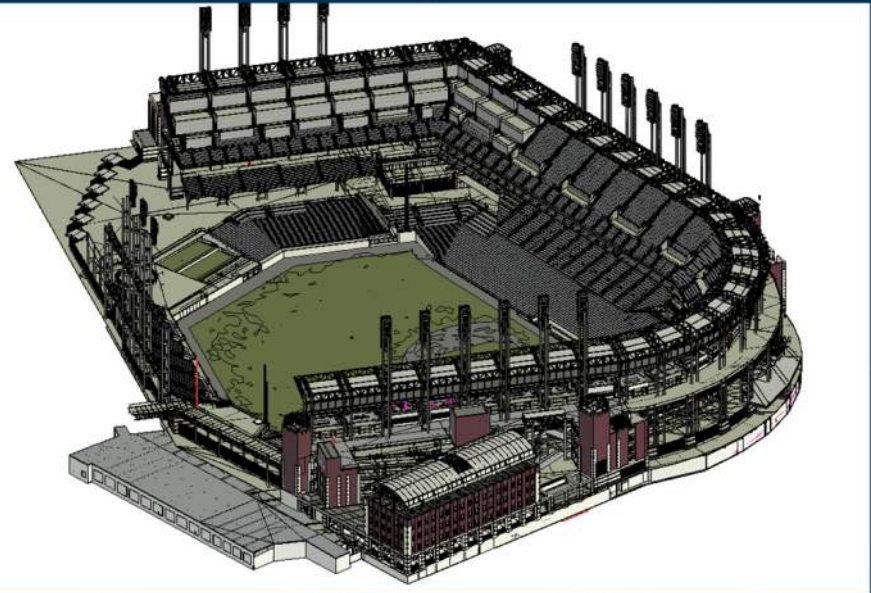
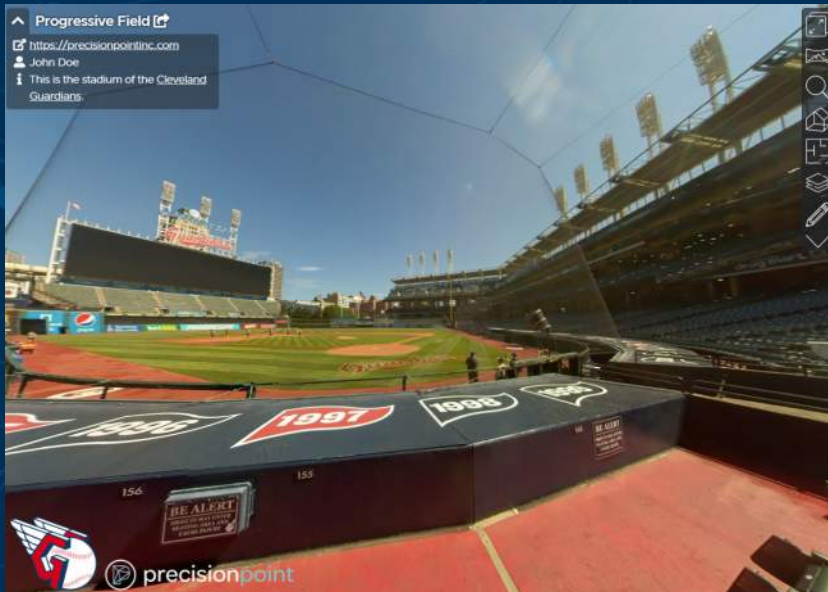
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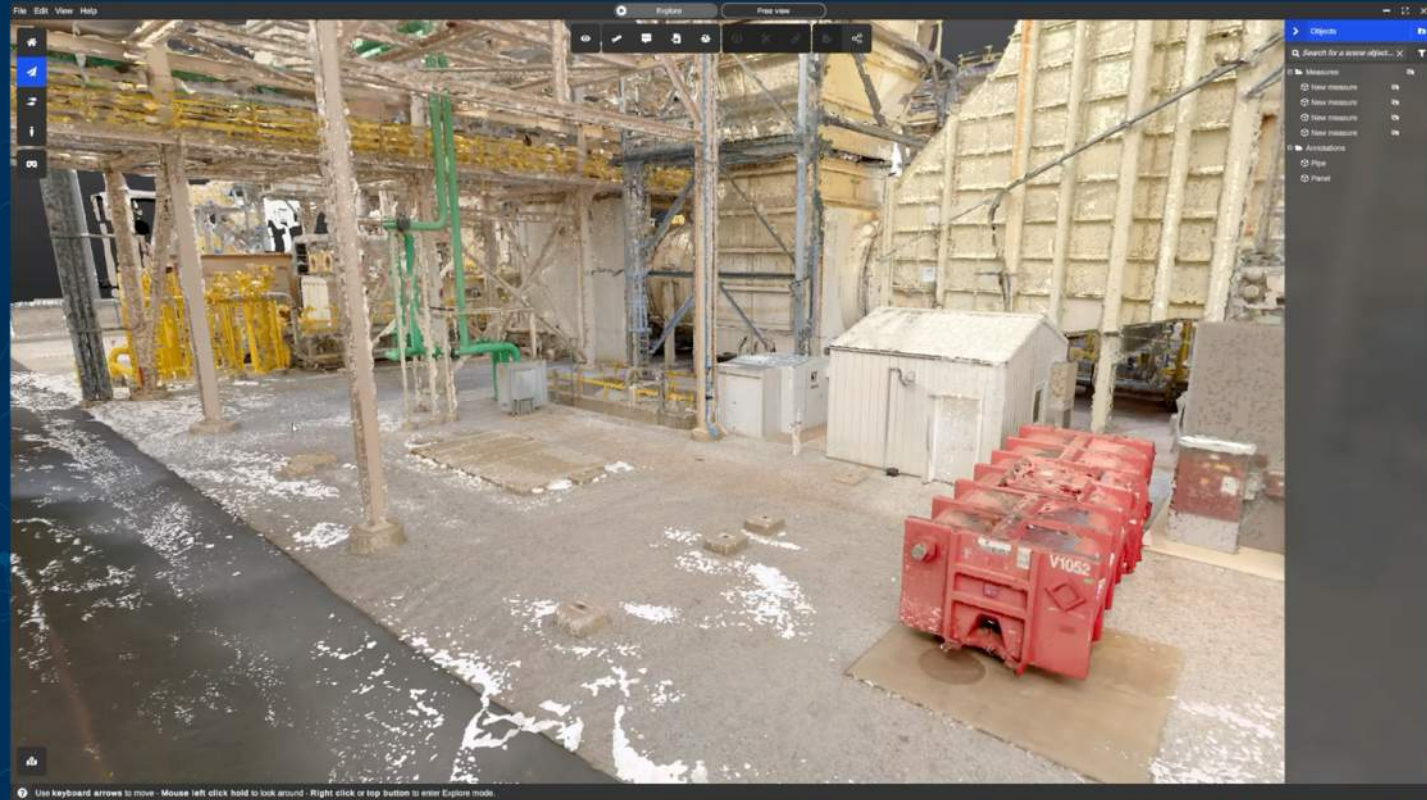
# MLB CLEVELAND GUARDIANS STADIUM RENOVATION

- + SCAN-to-BIM
- + Immersive Viewer



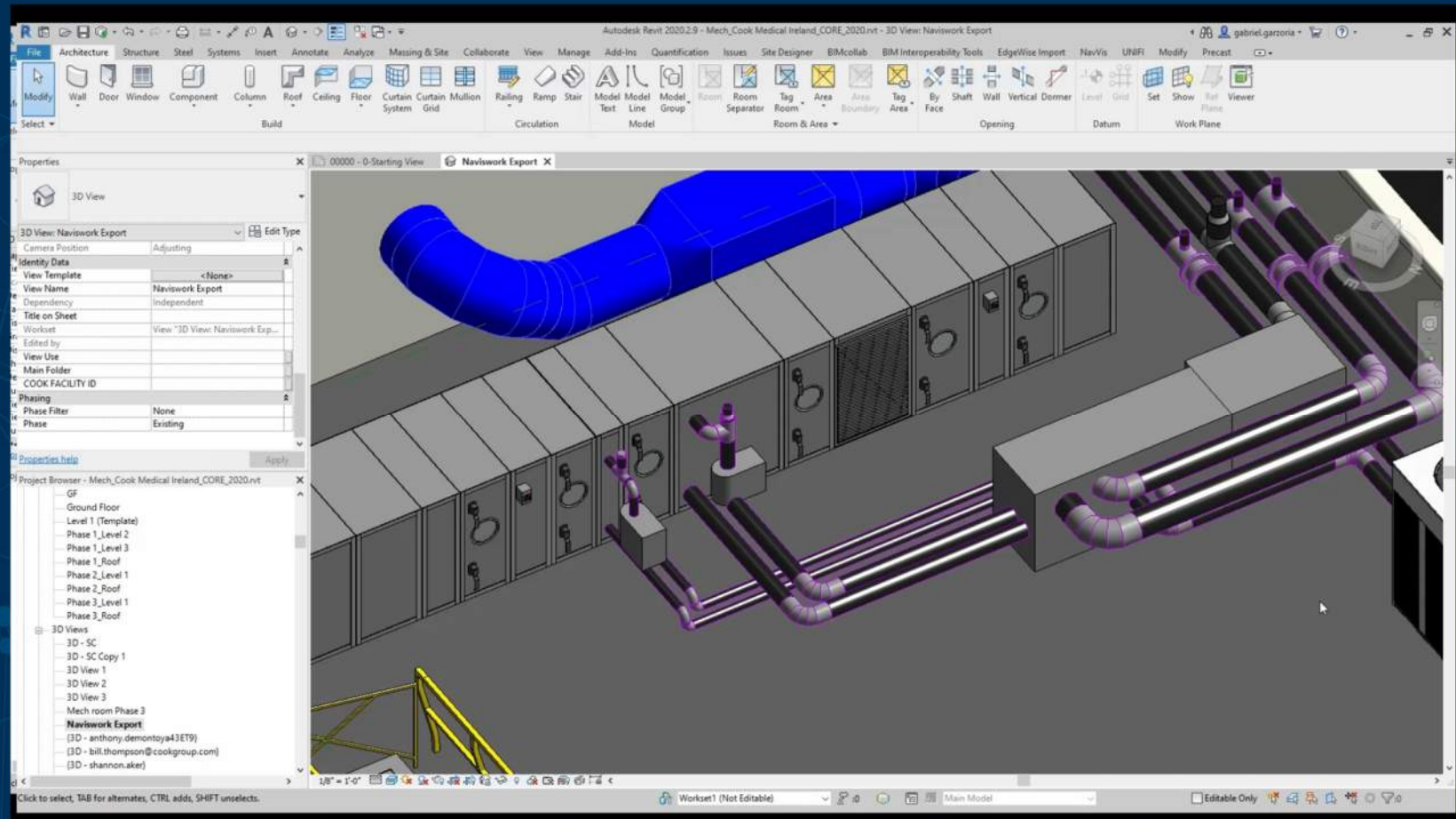
# NIPSCO: NATURAL GAS FIRED POWER PLANT

- + Virtual Clash Detection
- + Safety
- + Material Staging
- + Simulation





# COOK MEDICAL – FACILITY MANAGEMENT





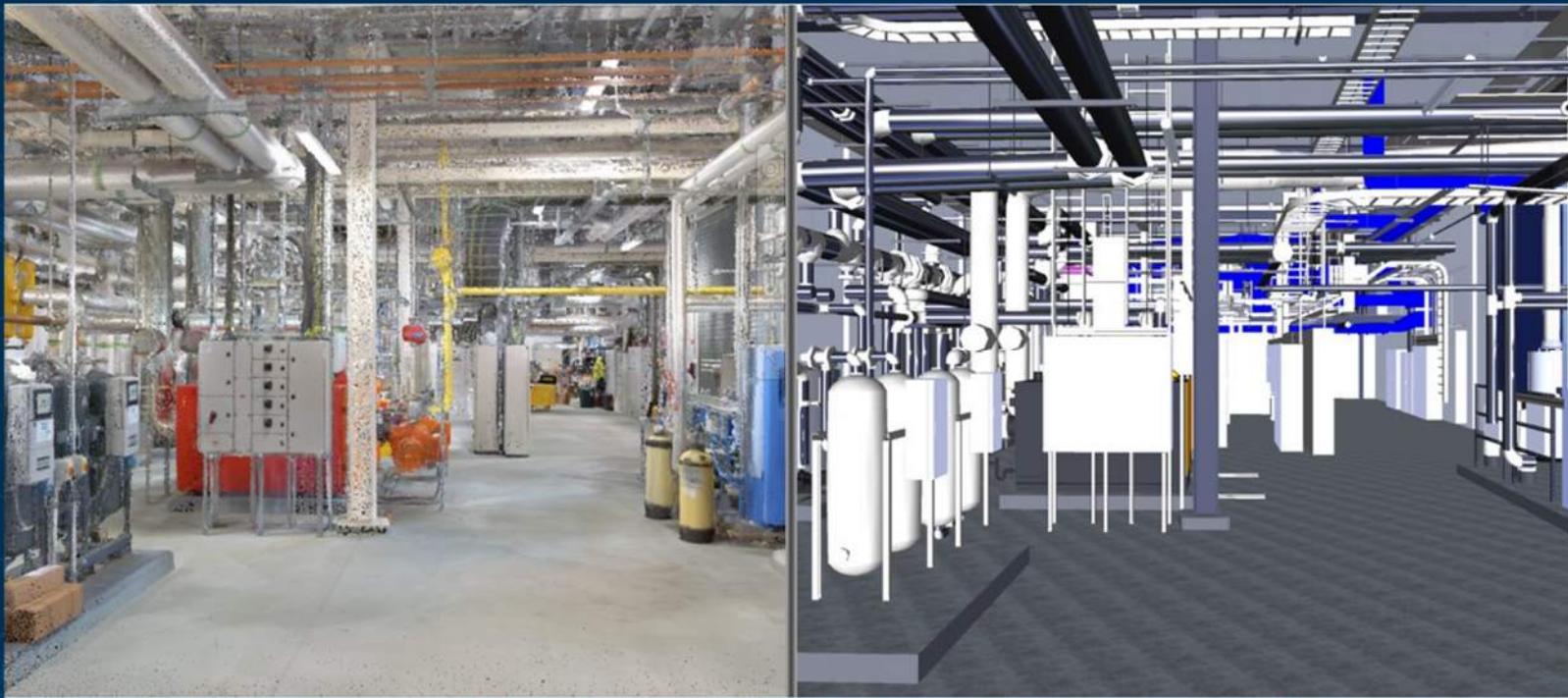
# SCHOOLS



# FLOOR PLANS

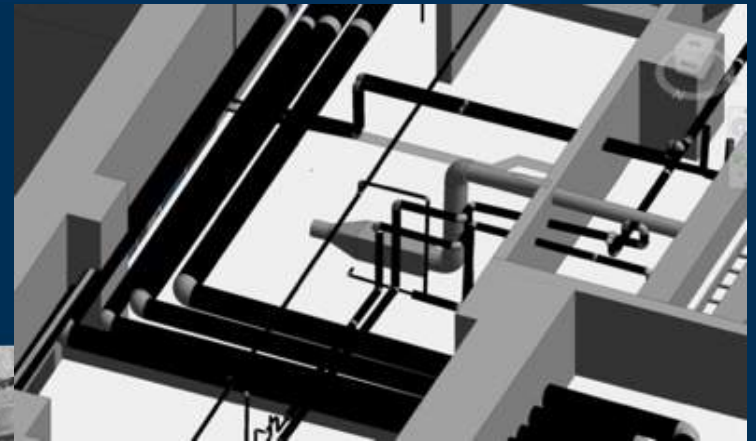


# MECHANICAL ROOMS

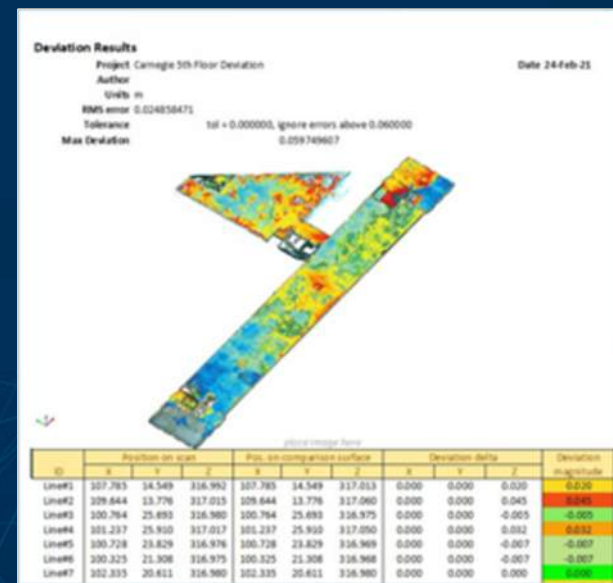
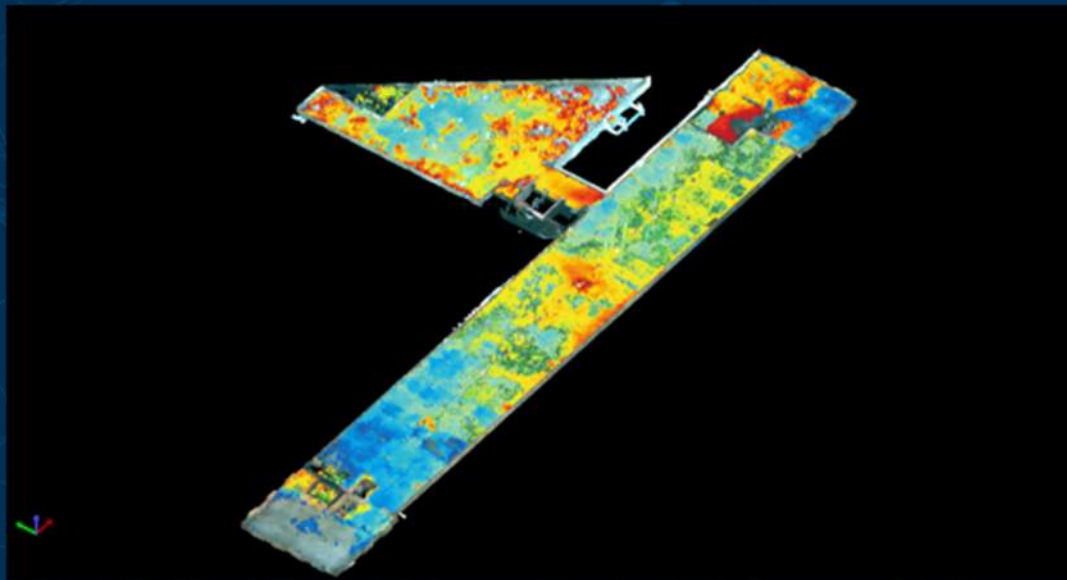




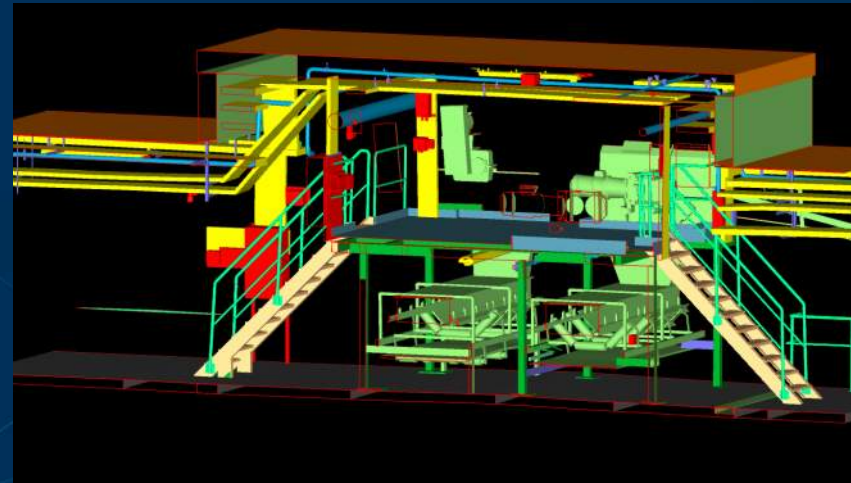
# HEALTHCARE (ABOVE CEILING)



# DEVIATION ANALYSIS

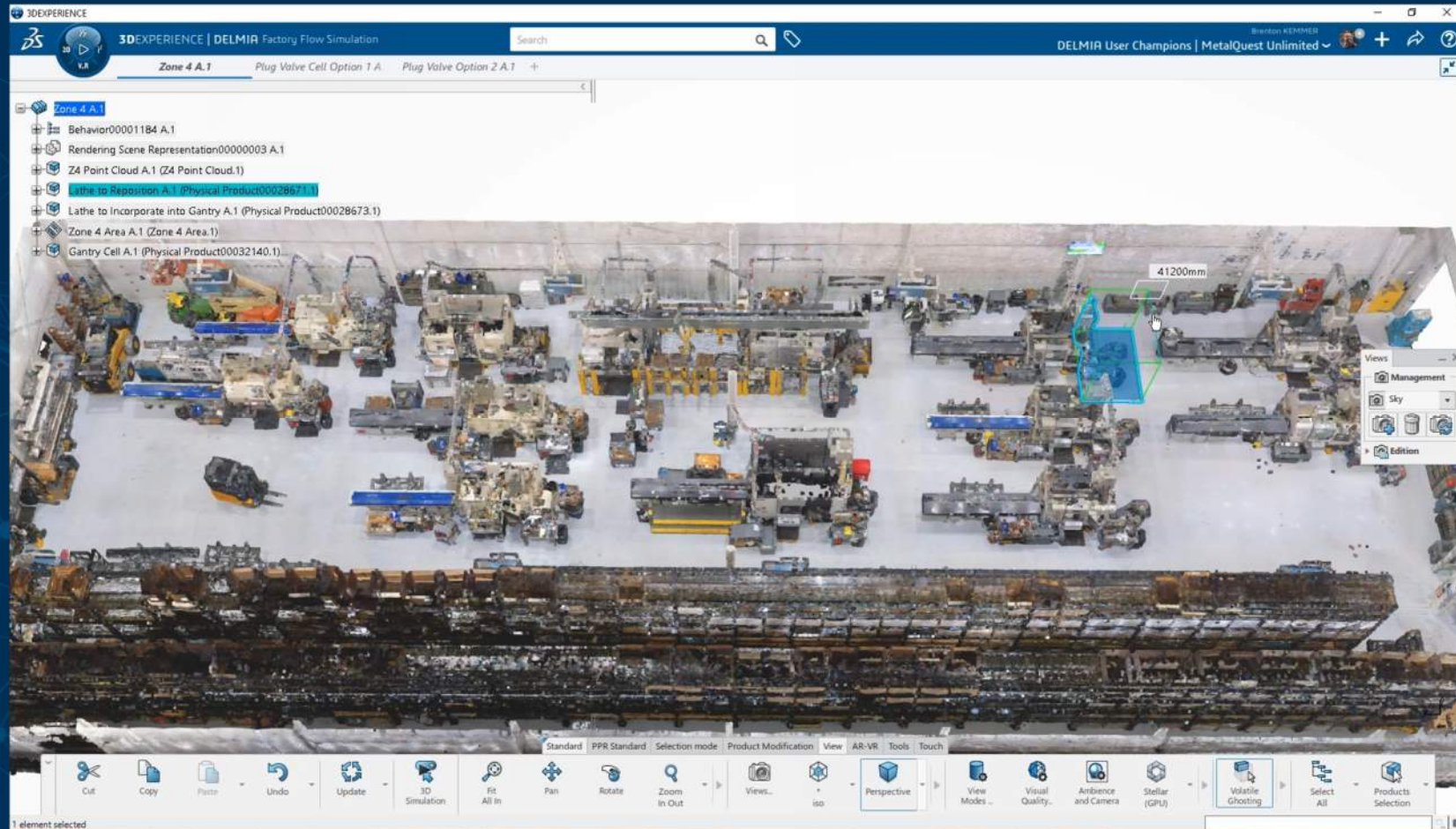


# MANUFACTURING AND FACTORIES





# FACTORY FLOOR OPTIMIZATION

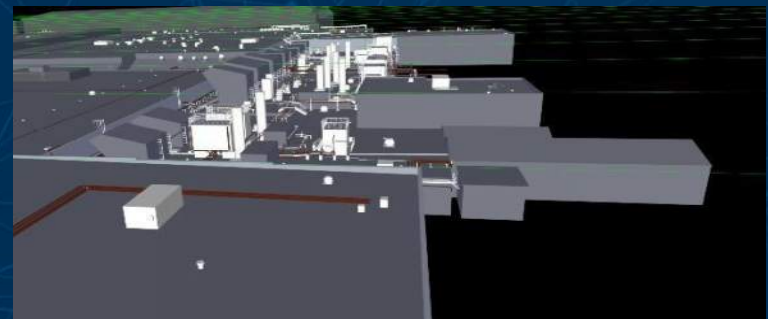


# CORPUS CHRISTY ARMY DEPOT

- SAM was contracted by an architectural engineering firm to create an existing conditions BIM model for a potential renovation of a large military facility.
- Utilizing advanced laser scanning and survey control, SAM meticulously captured a complete point cloud of the 1 million square foot facility, including areas above and below ceilings.
- The project involved a detailed pre-work plan, a complex schedule within a secure environment, and a sensitive chain of custody for the data, all while adhering to USIBD LOA 20 specifications.
- SAM's expert team developed and delivered a comprehensive LOD 300 BIM model encompassing architectural, structural, and MEP elements, enabling the client to proceed with design and engineering initiatives on time and within budget.



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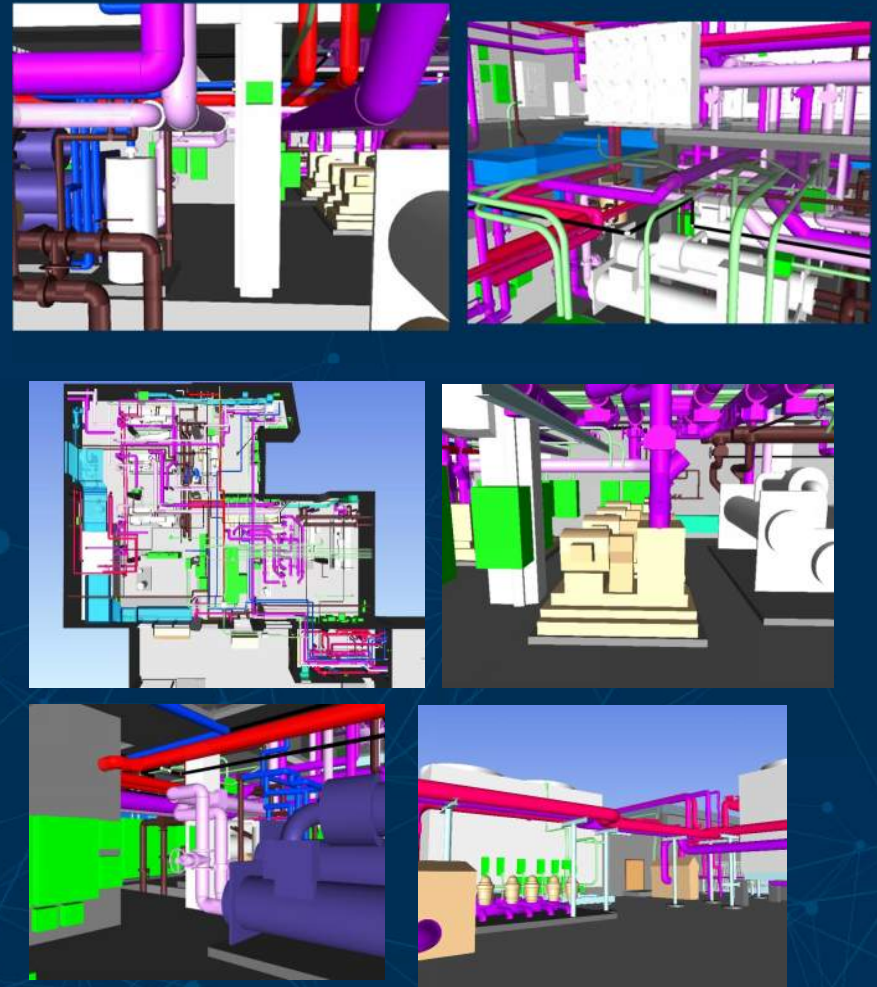




# NASIC - PROOF OF CONCEPT

- Successfully completed POC for NASIC BIM Implementation
- Created a 90-page BIM study and standard alignment
- Working on full 1Million SF execution of standard that was created in POC

Proof of Concept Photos

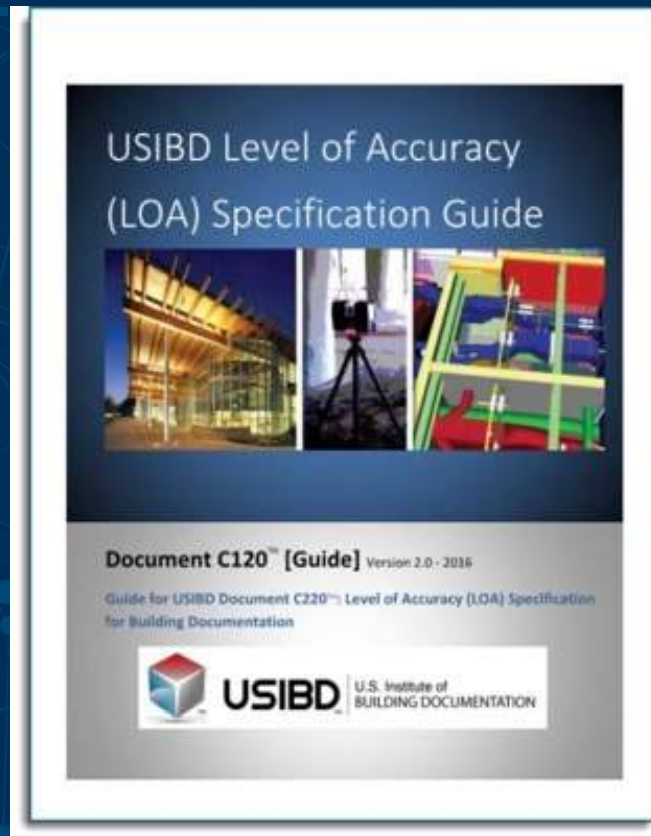




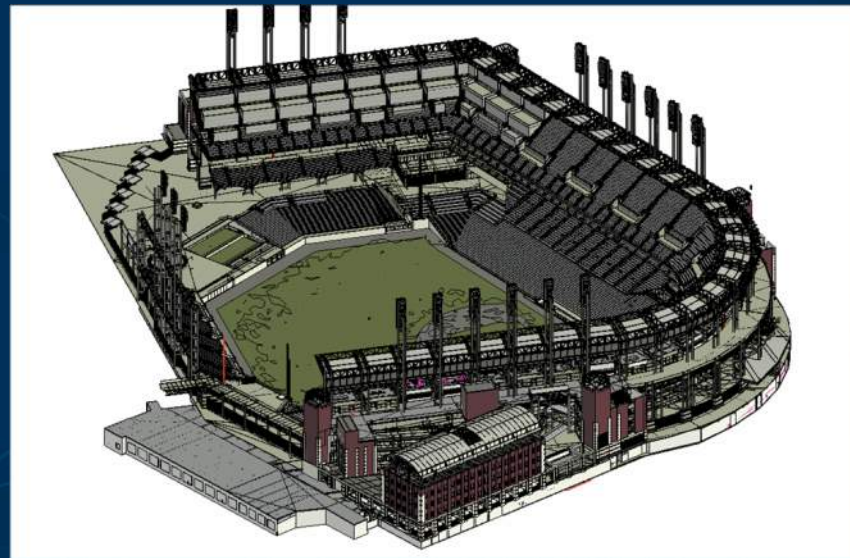
# NOTABLE CLIENTS



# INDUSTRY STANDARDS MAKE A DIFFERENCE



# STADIUMS







THANK YOU  
QUESTIONS?

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# AEC USE CASES



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# HYBRID SCANNING



One Unified Point Cloud





# PLUG AND PLAY COMPATIBILITY



 NAVISWORKS



 REVIT



 AUTOCAD



# DIGITAL TWINS



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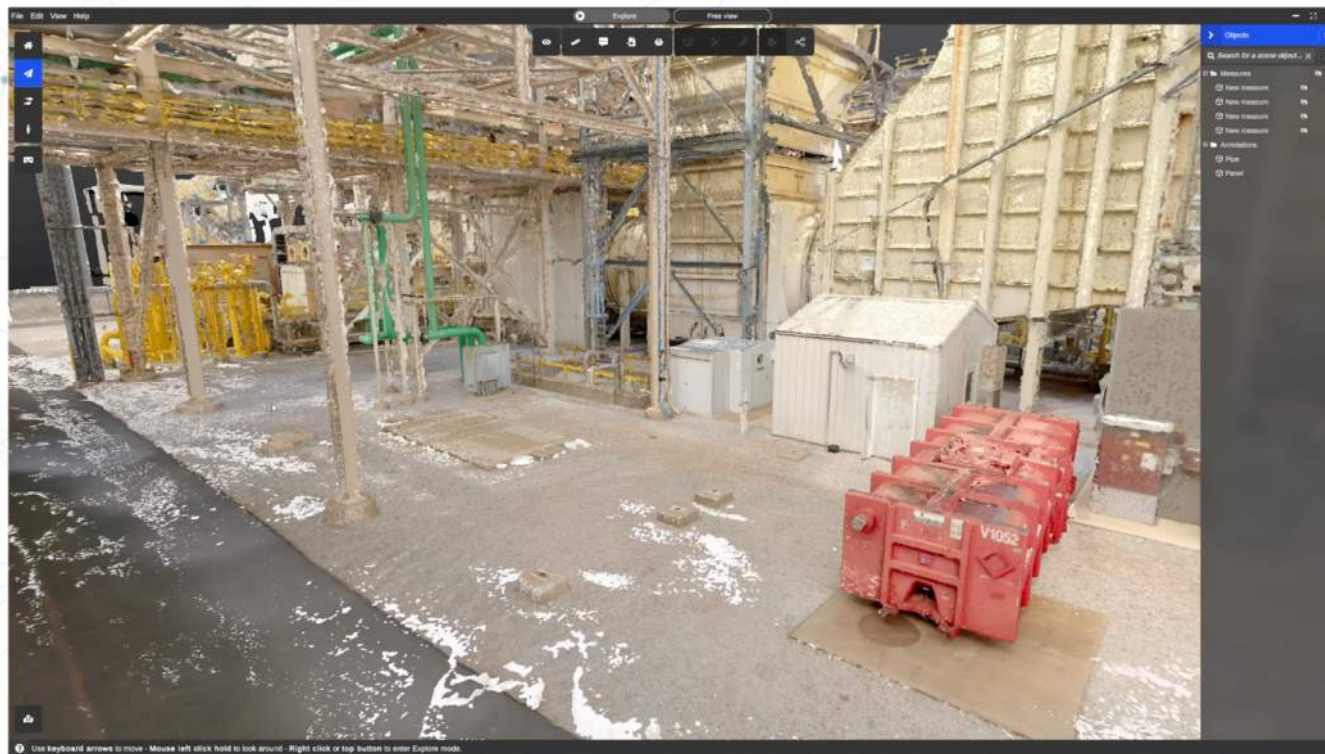
# WHAT ARE THEY USED FOR?



- + Design & Engineering
- + Manufacturing operational efficiencies
- + Commissioning & Equipment Planning

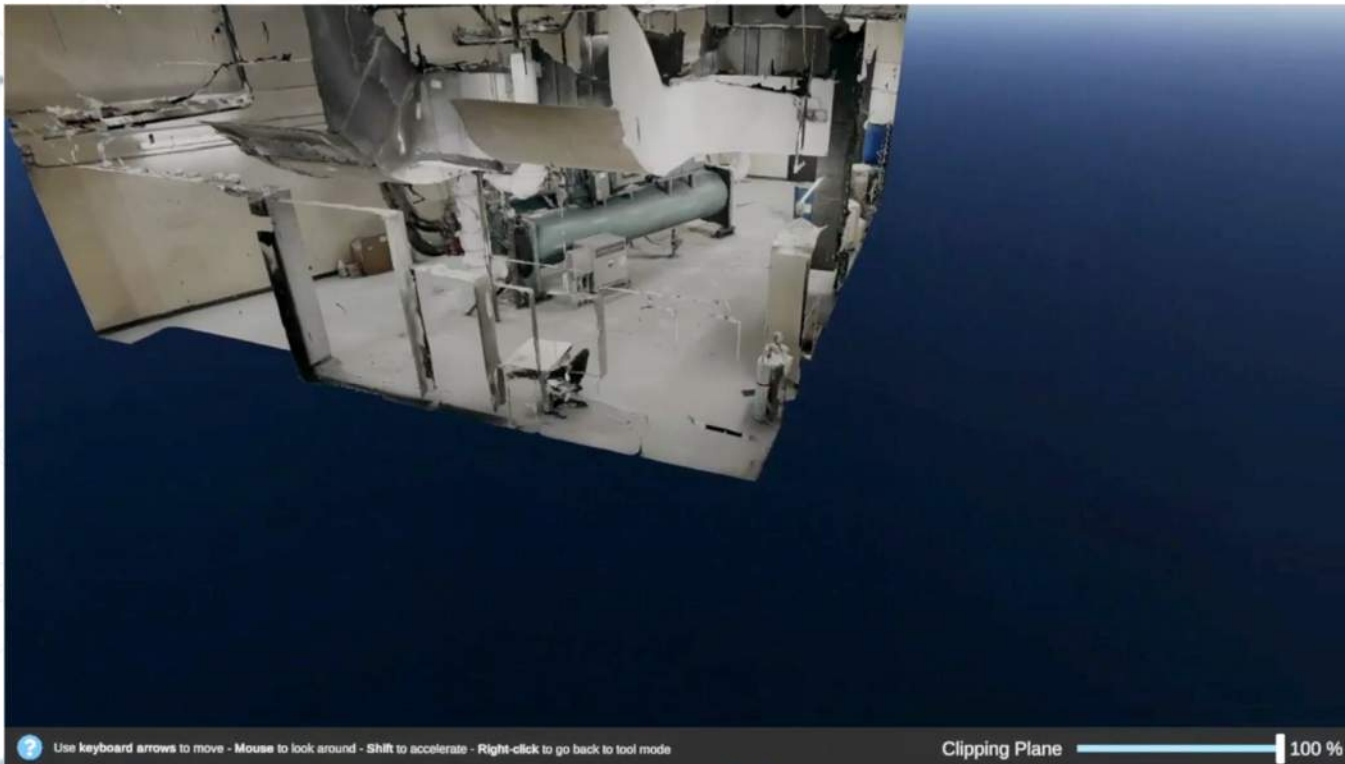


# VIRTUAL CLASH DETECTION



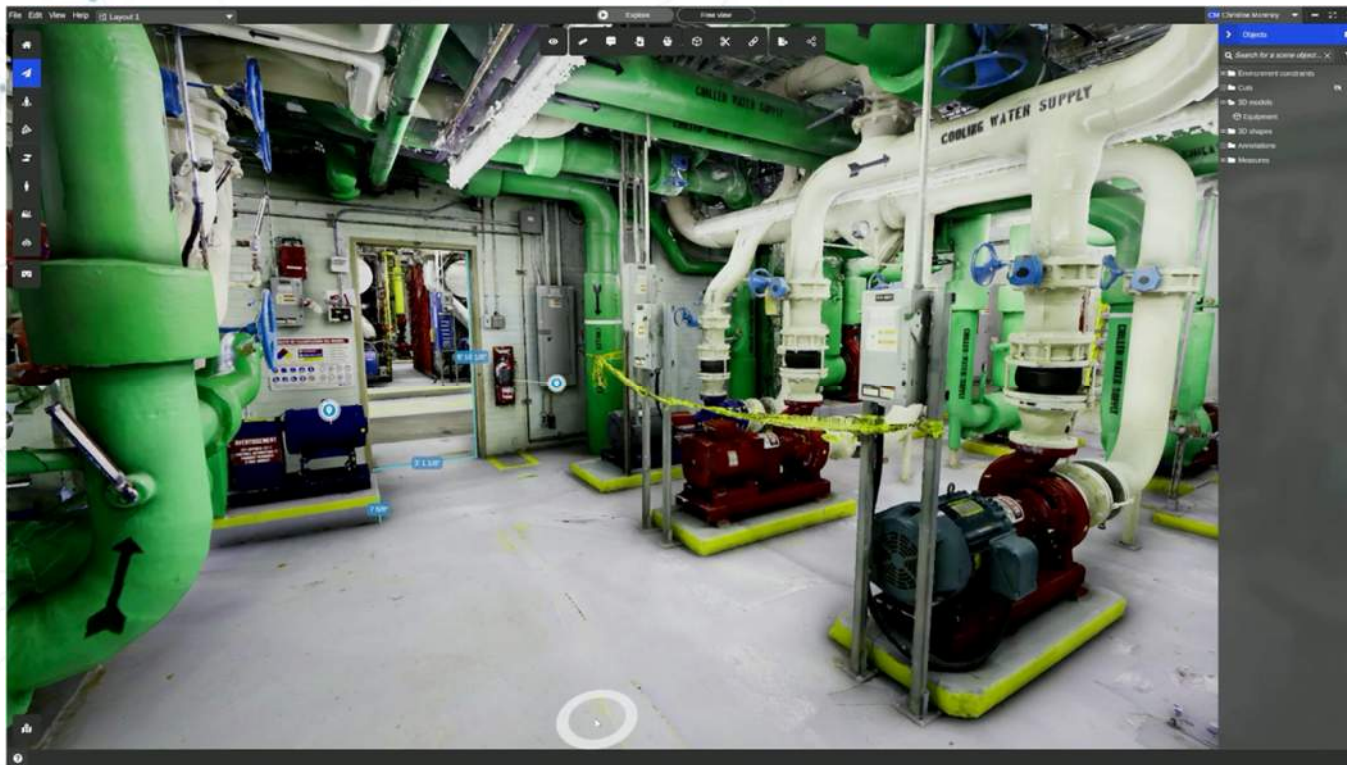
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# EQUIPMENT PLANNING



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# CLOUD SYNC



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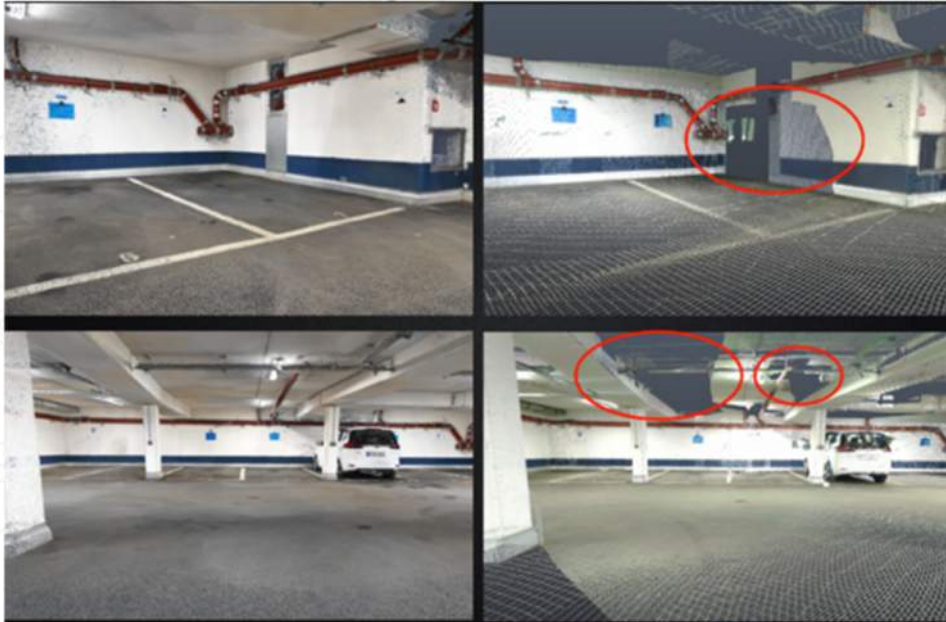


# COMPLETENESS OF DATA

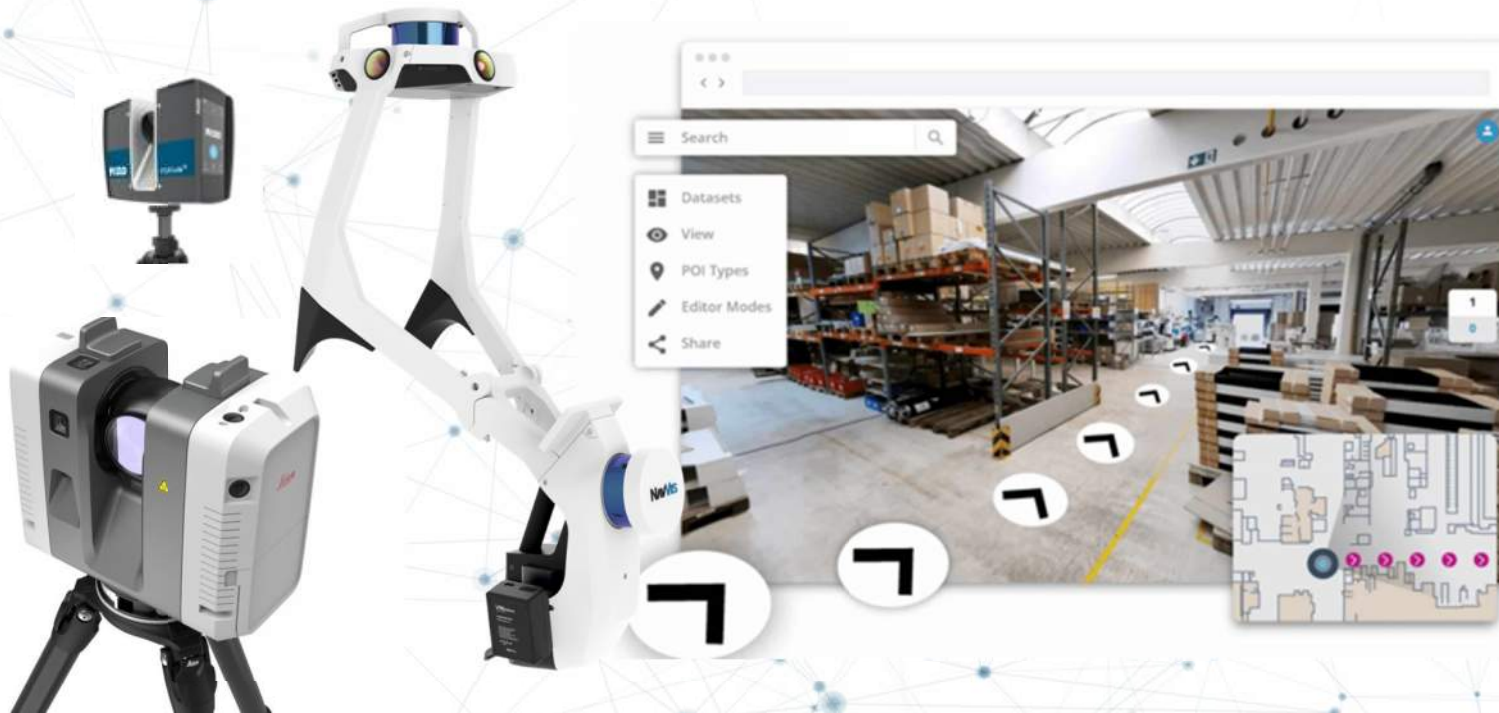


RapidScan

Tripod



# TECHNOLOGY TOOLBOX



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# CONSTRUCTION PROGRESS MONITORING



- + Fast & Affordable vs 360 photo documentation services
- + Map up to 200K SF per day
- + Scan in different project stages to establish a chronological traceability
- + Inspect the site at various points in time – right in your browser
- + Easy project management – track progress and identify sources of error
- + No additional software expense required
- + Annotate and create POI's for all project stakeholders



14. July

11. August

15. September



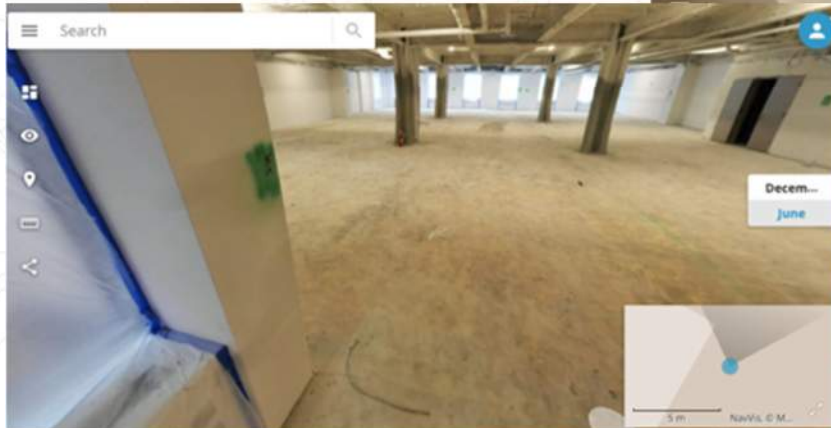
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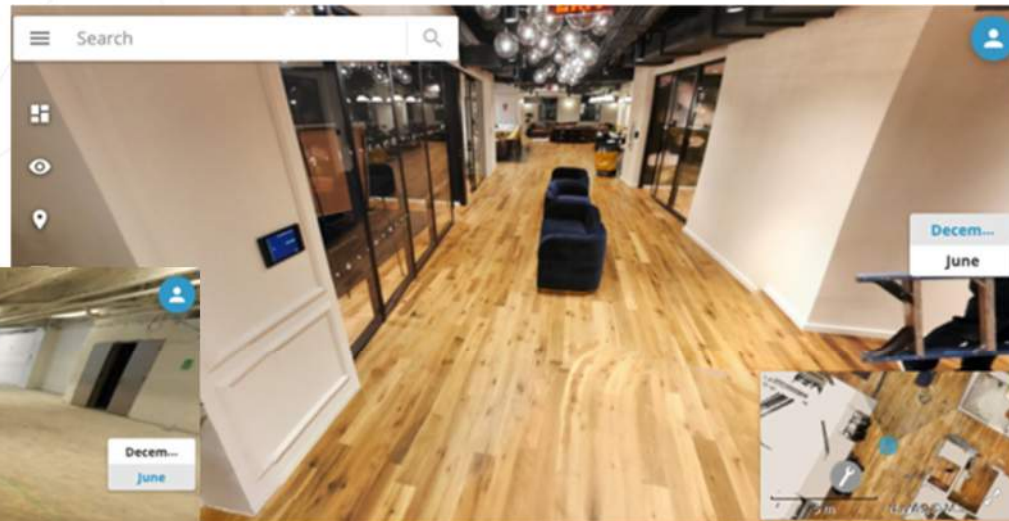
# PROJECT MILESTONE PLANNING



Before



After



# APPENDIX



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# SAM CORE VALUES

- + Keep it Real
- + Small Things Matter
- + Own the Outcome
- + Deliver the Wow



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# 3D SOLUTIONS



## Existing Conditions As-Built Solutions

- + Reality Capture Integrator
- + RapidScan™ Mobile & Wearable High-Speed Scanning
- + Tripod & Terrestrial 3D Scanning
- + 3D Models (Revit) –
- + SaaS Digital Twin Viewer Solutions
  - + PPI Secure Managed Cloud Server
  - + Enterprise Grade Virtual 360 Tours
  - + Point of Interest (POI) Creation
  - + Interactive Floor Plans
  - + Milestone Scans
  - + App Based Indoor Routing & Navigation
  - + BIM Model Integration



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# APPENDIX

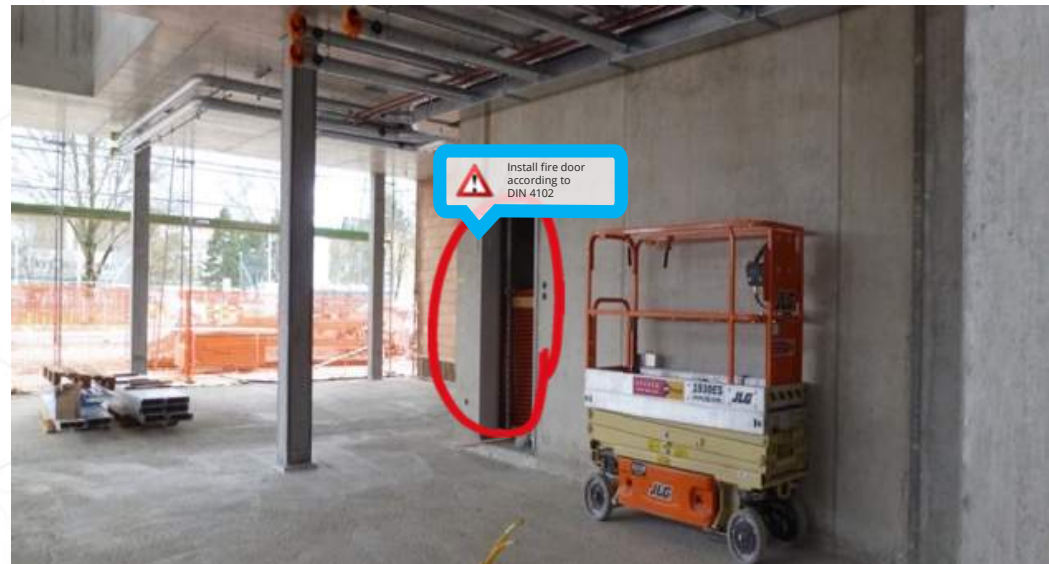
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- + RapidScan Backpack Scanner
- + Scan to BIM
- + Construction Use Cases
- + Mobile vs. Static Scanning
- + 360° Viewer Screenshots

# ONLINE PROJECT COLLABORATION

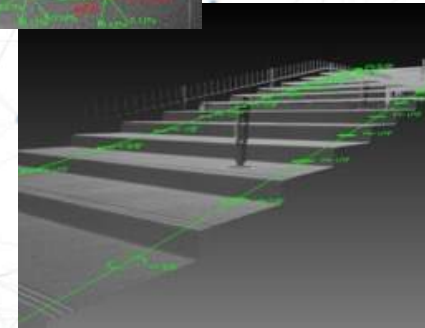
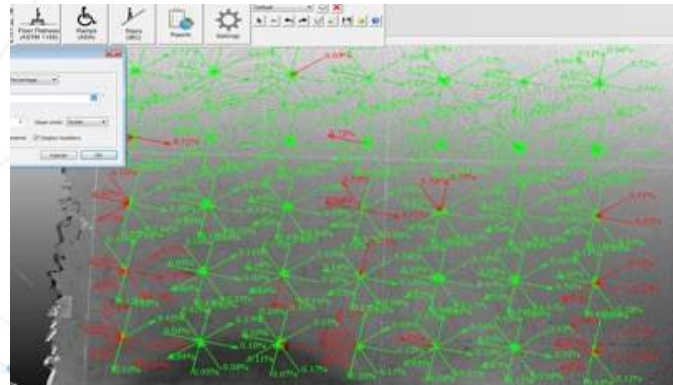


- + Share your current scene or start a virtual site inspection to avoid misunderstandings
- + Jump to the desired spot instantly – in your Intranet or online
- + Streamline processes and optimize the ramp-up of new project partners
- + Photorealistic environment for a superior recall value
- + Full data ownership – decide on your own who's getting access to your data





# CONSTRUCTION QA/QC WORKFLOWS: WET CONCRETE SCANNING



- + Determine concrete flatness from raw scan.
- + Quickly visualize high/low spots within pour.
- + Perform FF/FL according to ASTM 1155.
- + Automated inspecting stair riser heights to check compliance



# MOBILE VS STATIC...

## Mobile (RapidScan):

- + Higher speed of capture and delivery
- + Web-based 3D Viewer
- + Significantly more 360-degree images
- + Always color photography & point cloud
- + Smaller file sizes (~ 25%)
- + Same point cloud deliverables (RCP/RCS)
- + Less Expensive
- + +/- 1" with SLAM (120,000 SF)

## Static:

- + Higher point cloud resolution
- + Above ceiling and confined space scanning
- + MEP below 1"
- + Long range scanning (outdoors)
- + LOA30

Level of Accuracy (2 $\sigma$ std dev)				
-	2"	5/8"	1/4"	1/16"
2"	5/8"	1/4"	1/16"	0
LOA10	LOA20	LOA30	LOA40	LOA50

# IMMERSIVE 360 VIEWER



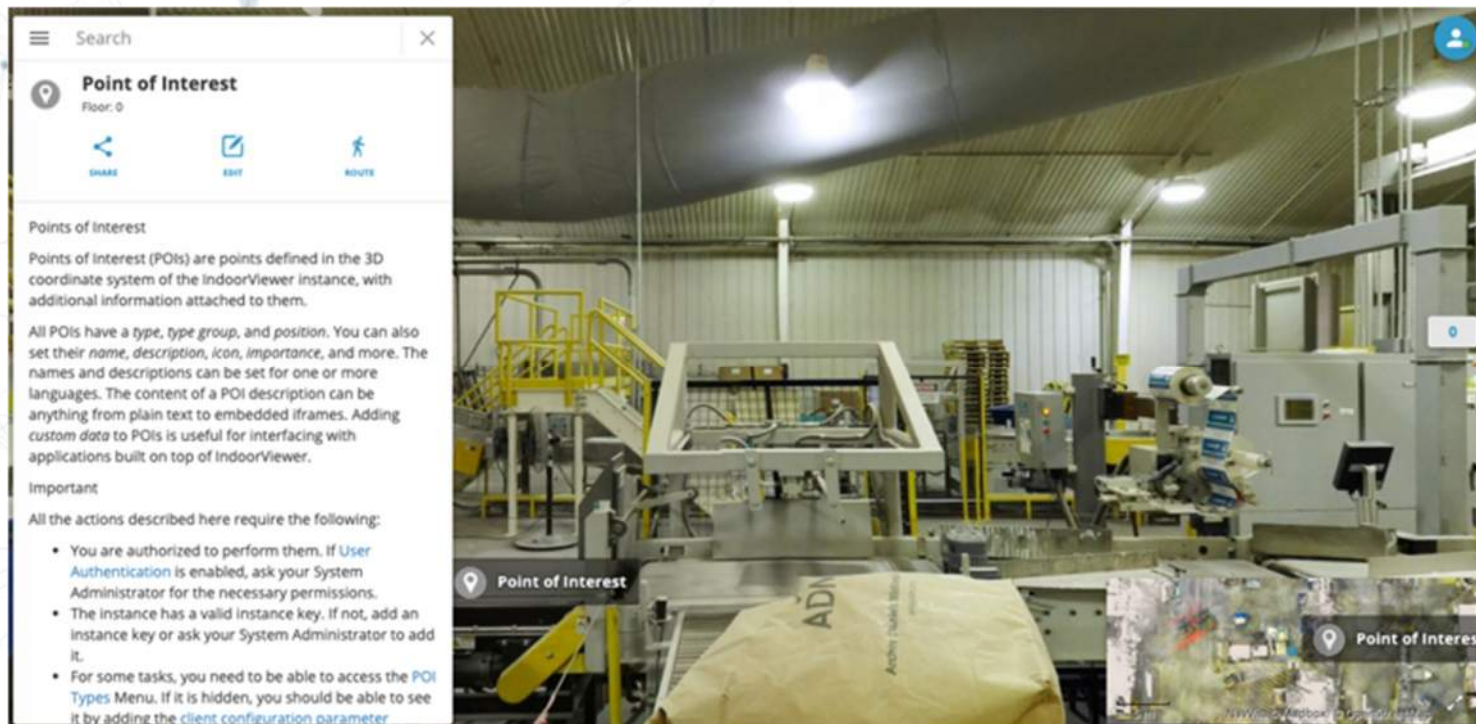
(Powered by NavVis)



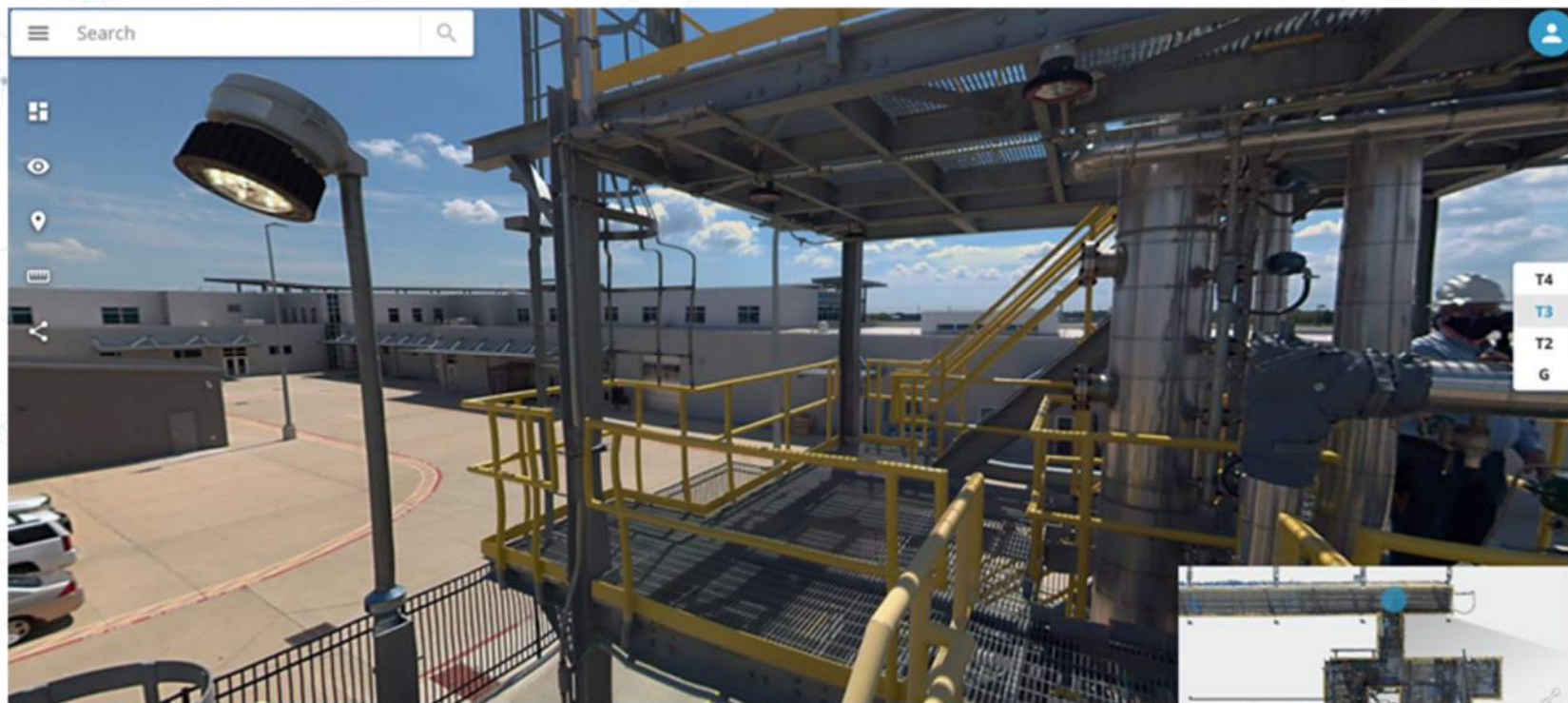
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# 360° VIEWER - SCREENSHOTS



# 360° VIEWER - SCREENSHOTS



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# 360° VIEWER - SCREENSHOTS



## Point Cloud from 3D Scanning



Image



Point Cloud



# 360° VIEWER - SCREENSHOTS



## Point Cloud from 3D Scanning



Image



Point Cloud

# TECHNOLOGY MATCHED TO YOUR REALITY CAPTURE NEEDS



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