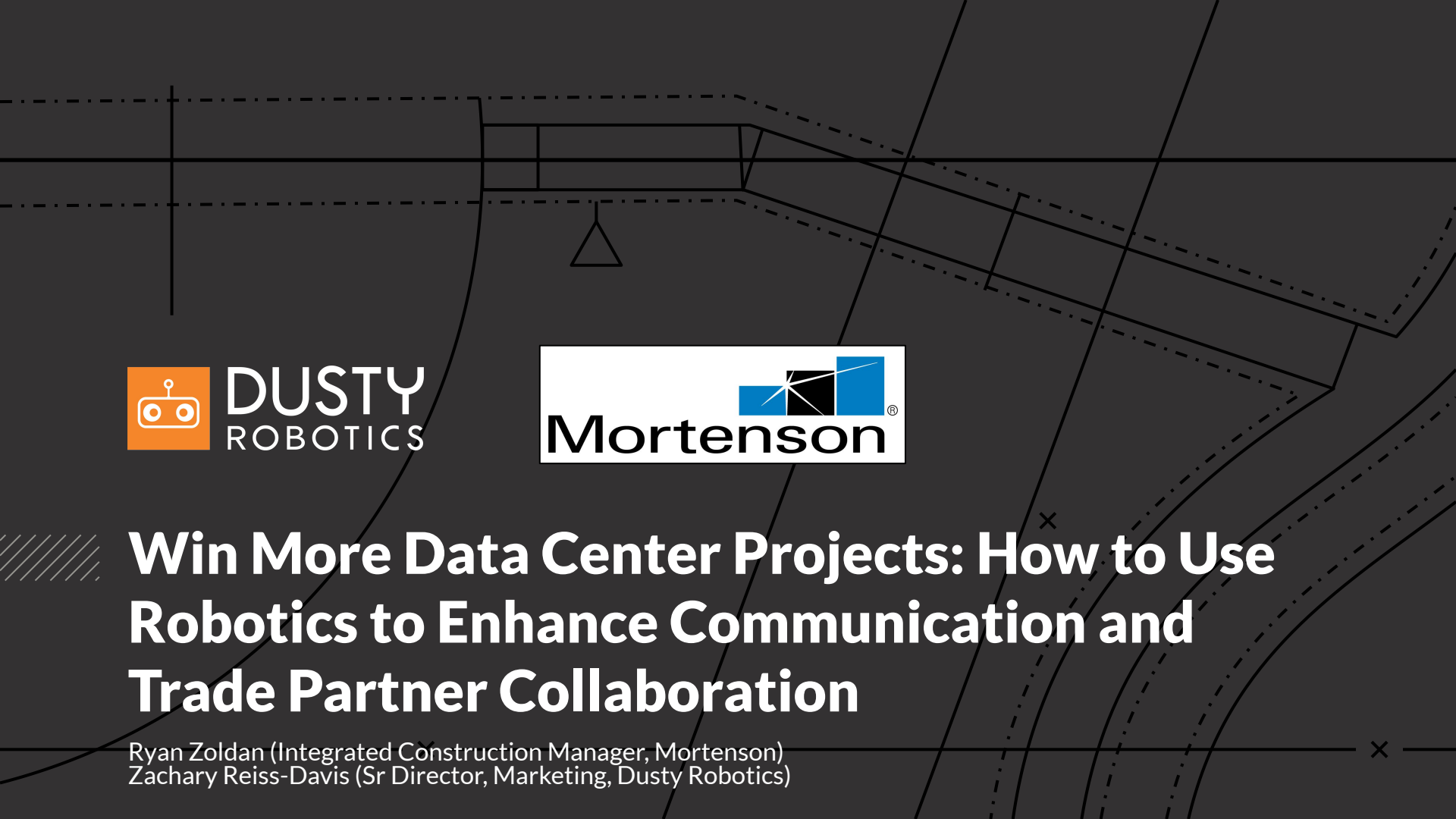
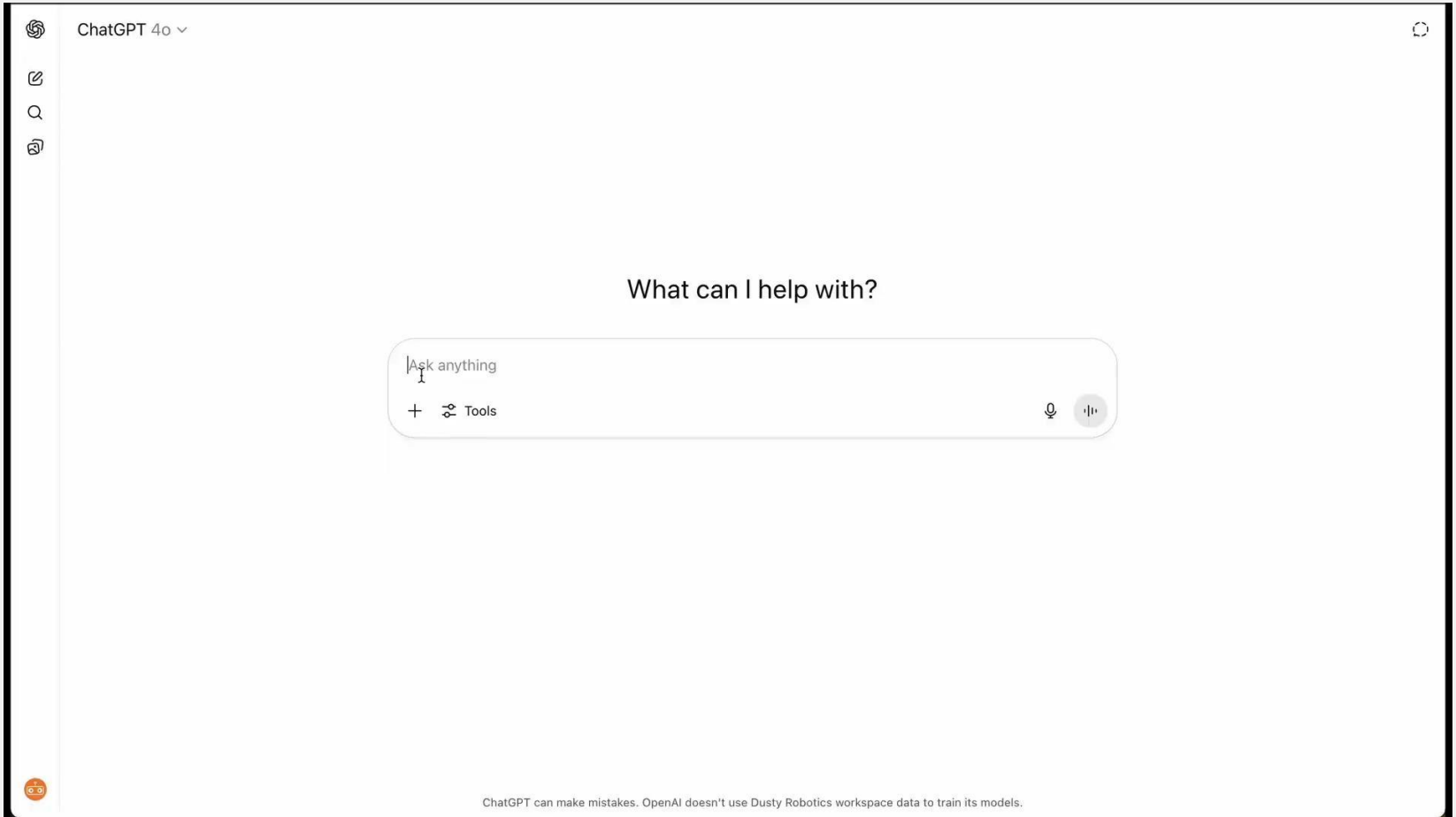


Win More Data Center Projects: How to Use Robotics to Enhance Communication and Trade Partner Collaboration

Ryan Zoldan (Integrated Construction Manager, Mortenson)
Zachary Reiss-Davis (Sr Director, Marketing, Dusty Robotics)

ChatGPT, Why Data Center Construction?



Let’s Focus on the Answer

Massive Growth of Data Center Demand

Capital expenditure on data centers is to surpass $1 trillion annually by 2029.

Higher Margins through Specialization

Average gross profits of 8-12%. Final margins of 2-6%.

Faster Project Cycles for Velocity of Revenue

Projects face aggressive timelines in current economic climate.

Incubators for advanced construction methods

BIM and construction technology central to Data Center Growth.

Pipeline Risk Mitigation with Project Types

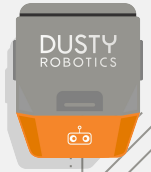
U.S. Data Centers are 40% of global market. 10% CAGR through 3030.

Long-Term Client Relationships

U.S. Data Center Maintenance And Support Services of $3.6B in 2023; 12% CAGR to $9.9 B by 2032.

In short:

There’s a LOT of money building the next generation of data centers!



Mortenson's Data Center Experience

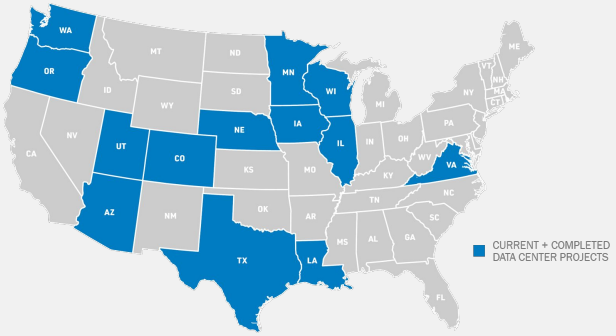
TOP 10
DATA CENTER BUILDER
IN THE U.S. BY ENR

$5.5B+
DATA CENTER WORK IN
THE LAST 5 YEARS

20+
YEARS OF DATA
CENTER EXPERIENCE

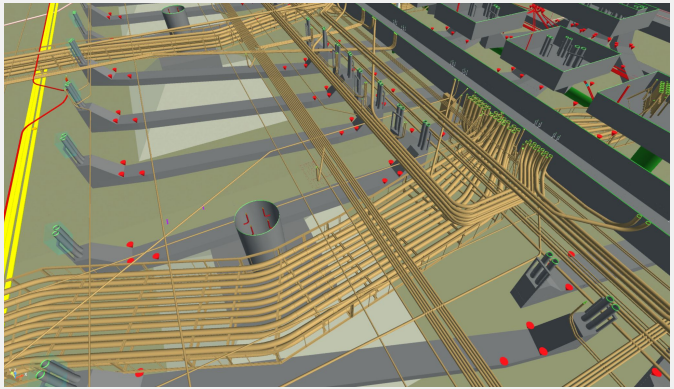
3.5+ GW
UNDER CONSTRUCTION
OVER 12 CAMPUSES

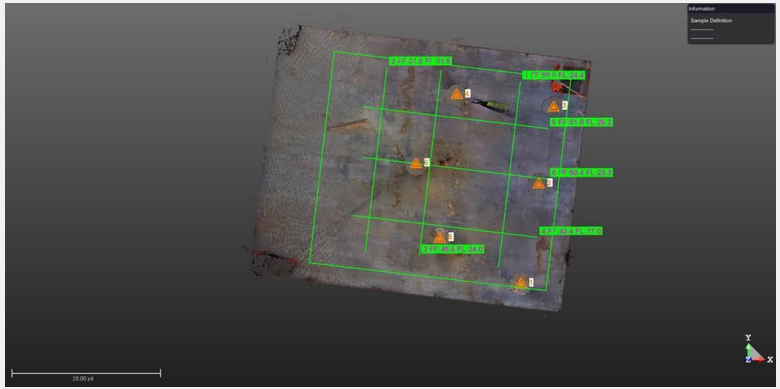
350+
DATA CENTER TEAM MEMBERS
THROUGHOUT THE ORGANIZATION



Data Centers (and Their Owners) are Just Different

1. Extremely high quality bar
2. Technology-forward and innovative owners
3. Very high price tags for equipment and installation
4. High time / schedule pressure
5. Remote locations increase labor shortages
6. Complex MEP needs
7. Large scale project facilitate more tech adoption
8. Prefabrication requires concrete levelness over long distances





Hyperscale Data Centers Unique Complexities

Off-Site Manufactured Equipment

Installation tolerances are really specific.

Requires exact right information, in the right time, to avoid mistakes.

These components are procured by the owner directly and shipped on-site intact.

Schedule impacts

Fast pace coupled with timing of owner furnished equipment

Coordinating/installing electrical conduit stub-ups before final approvals

Imperfect Information

Decisions often need to be made before all the information is available

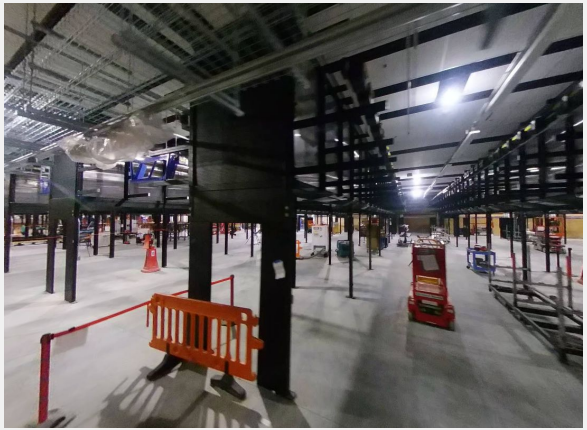
Everything is Prefabricated

Mortenson's own BLUvera wall panels

Equipment Pads

Off-Site Manufactured Components

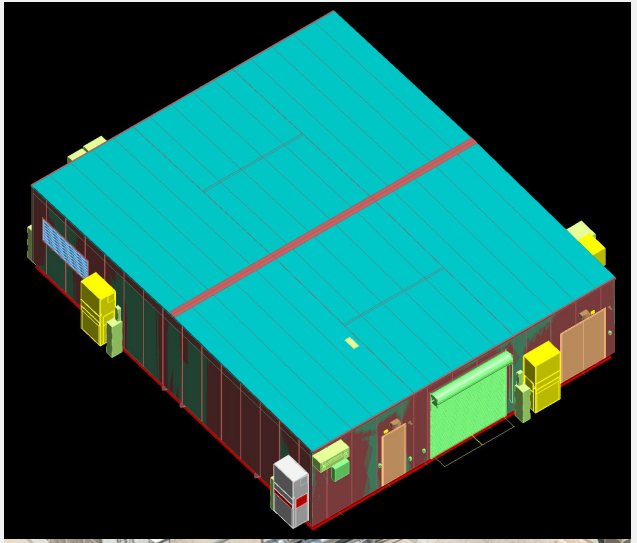
- Multi-Trade Rack
- Hot Aisle Containment
- MDF Rooms
- IDF Buildings
- MCUP Buildings
- Electrical Skids



The Model is the Truth

Everything is fully modeled in Revit

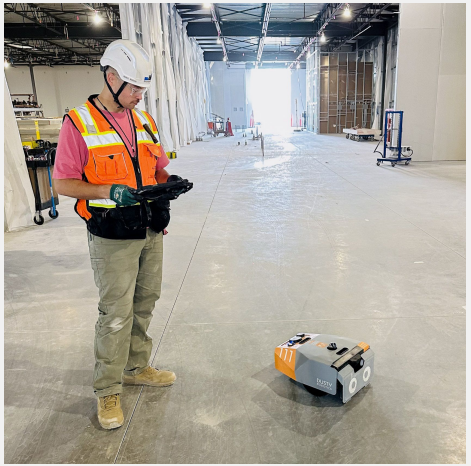
1. Server rack floor layout
2. Hot Aisle Containment systems
3. Complete Off-Site Manufactured Equipment
   a. MDF Rooms
   b. IDF Buildings
   c. Electrical Skids
   d. MCUP Buildings
4. Prefabricated wall panels
5. Housekeeping Pads
6. Multi-Trade Rack



Investment in Technology for Collaboration

The model information can't be stuck in the model.
Mortenson surfaces it in three different ways:

1. Virtual Reality (VR)
2. Augmented Reality (AR)
3. Automated Multi-Trade Layout



VR Empowers Data Center Owner Alignment

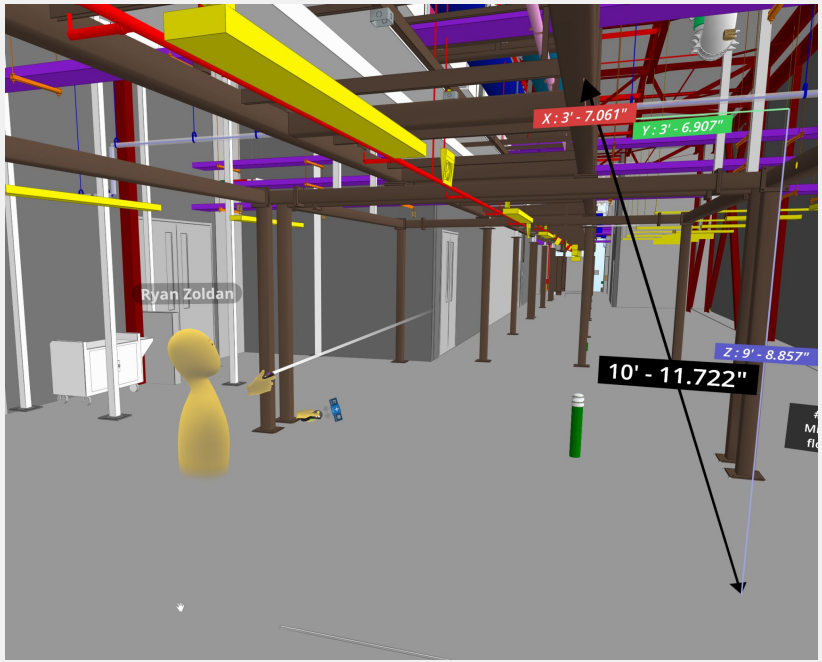
Top Data Center owners have a special soft-spot for VR technology.

Reduces rework due to field walk issues; reduces risk of late completion.

- Early visibility to field conditions
- More immersive experience
- Software/hardware barriers removed
- Flexibility to join VR from anywhere

What do we look for?

- Facility maintenance accessibility
- Safety concerns
- Design improvements
- Constructability issues

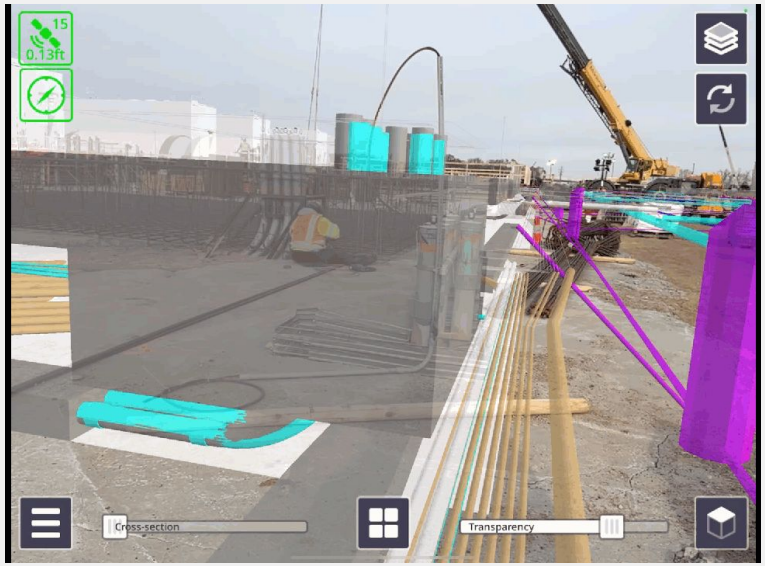


AR Shows the Model on the Jobsite

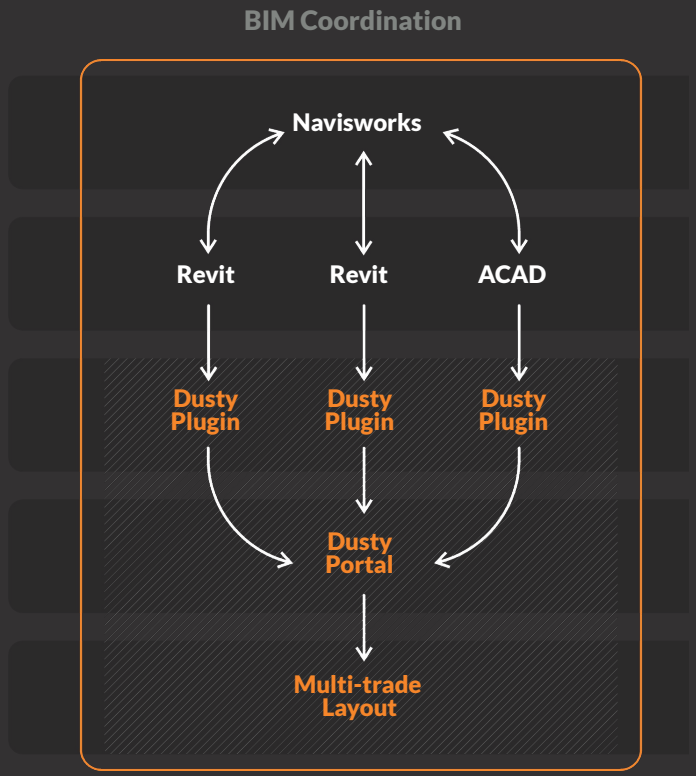
Enables enhanced planning by visualizing the model in the field, in context.

Not accurate enough for installation, too cumbersome to use every day.

Trimble Site Vision



How Dusty changes the workflow



- Coordination and collaboration in the field
- Pull information from the model to the point of work
- Eliminate errors due to manual work processes
- Accelerate the critical path schedule

What you see is what you build

Quality

Be confident that you will accurately build the right thing, from the right model, every time.

Collaboration

Avoid communication breakdowns between design and field teams and between each trade on a project.

Speed

Shorten construction timelines and complete projects faster with fewer labor hours.

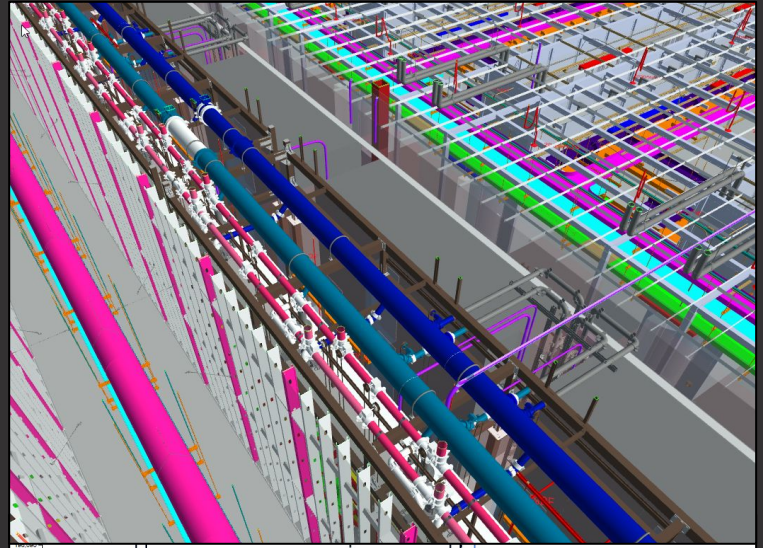
Automated Multi-Trade Layout for Coordination

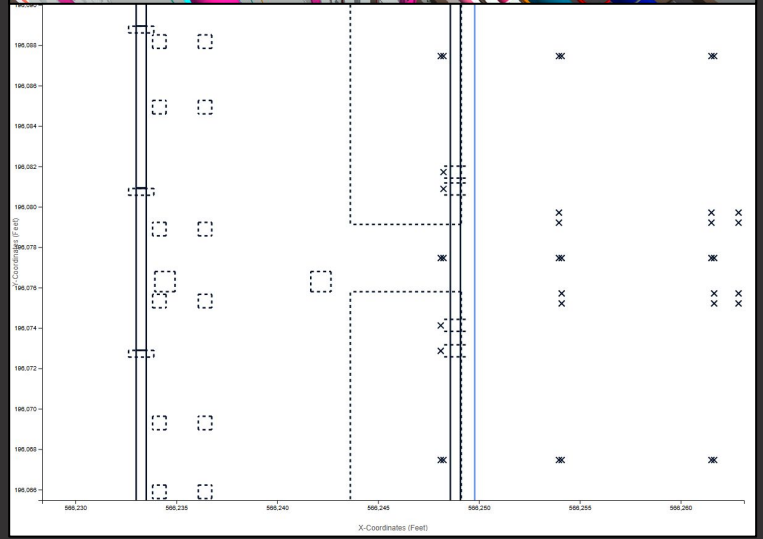
13,762 points, **94,987** linear feet of line on this project so far.

Owner mandates what's in the model, not what's laid out.

New information from model included for quality. Started with BLUvera Prefabricated Wall Panels; includes line styles, panel numbers, panel outlines, drywall side.

Expanded to details for all trade points.




196,088
196,086
196,084
196,082
196,080
196,078
196,076
196,074
196,072
196,070
196,068
196,066
Y-Coordinates (Feet)
566,230
566,235
566,240
566,245
566,250
566,255
566,260
X-Coordinates (Feet)


X-MP-HANG-391
X-MP-HANG-391

Everything in the model is printable

Framing	Mechanical & Plumbing	Electrical	Enhanced
Track & finish	Hanger points	Light fixtures	Grid lines
Door ROs, swings	Point labels, ID linework & text	Hanger points	MEP rough openings
Door dimensions	Duct shop drawings	Rack locations	Dimensions, heights
Soffits & fascia	Deck sleeve penetrations	Conduit	Installation instructions
Stud layout	Equipment base plates & anchors	Cable tray outer line	Finish schedules
FEC locations	Duct height & size labels	Outlets, light switches	Formwork
Ceiling tags	Device outlines	Low-voltage devices	Equipment labels
Serpentine walls	Rack locations	Security devices	Enriched line styles
	Outline or center line of piping run	Assembly wall systems	Radius layout
	Plumbing centerlines		Sleeves
	Plumbing devices		Curve printing
			QR codes
			And more.....

Balancing Stakeholders and Risk

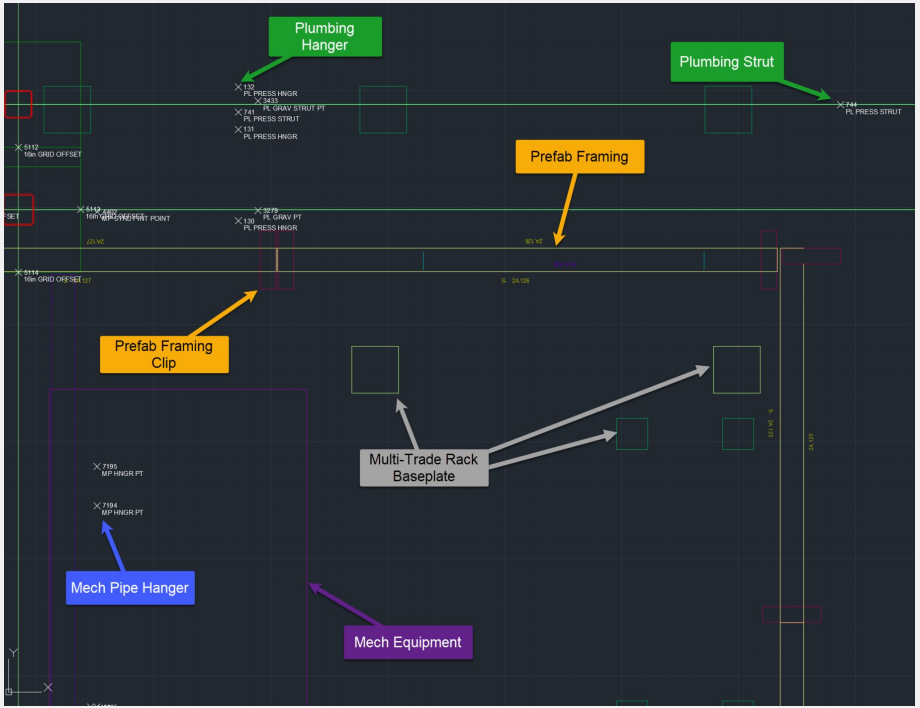
Started with Mortenson self-perform; offered to other trades without charge

Mechanical contractor started hesitant; field team saw it, started asking for more.

Inconsistencies in the model can end up in the field directly.

Seeing is believing in both digital models and Multi-Trade Layout.

Each trade still validates their own layout and confirms the information.



Dusty on a Mortenson Data Center Project

Tech Innovation Enabling a Better Experience

VR Operations Review

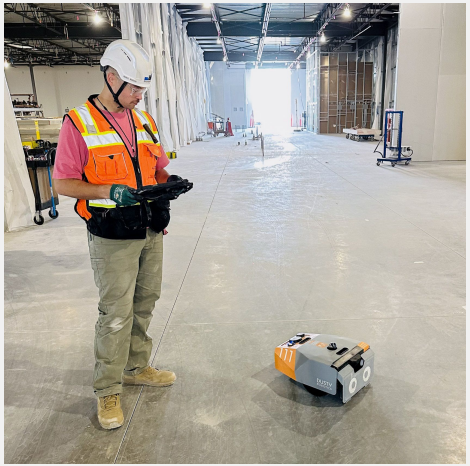
- Resolve more accessibility/operations issues using fully immersive environment
- Shift client field walks earlier

AR-In-Context Planning

- Alignment between model, field conditions and planning

Model-Based Printing

- Absolute accuracy
- Reduced manual labor



Seeing is Believing; Q&A

Let's see this in real life. Dusty can print anything you need – and you can show that off to as part of your next data center project. Let's check it out.