

# Emerging Technologies in Design-Build

And How Can They Help You? . . .

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**Moderator:**

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**Presenters:**

**Casey Mahon**, AIA  
Digital Practice Manager  
Carrier Johnson + CULTURE

**carrierjohnson + CULTURE**  
architecture + environments + brand strategy + graphics

**MCCARTHY**

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McCarthy Building Companies

**BNB**  
BNBuilders

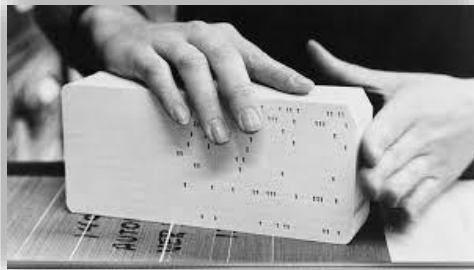
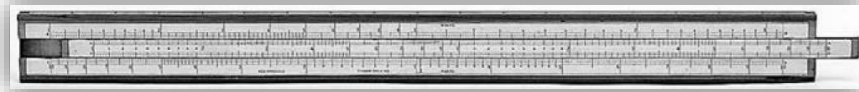
**Chris Everist**  
BIM Manager  
BNBuilders



DGA planning | architecture

# Emerging Technologies in Design-Build

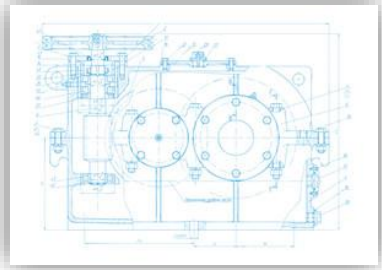
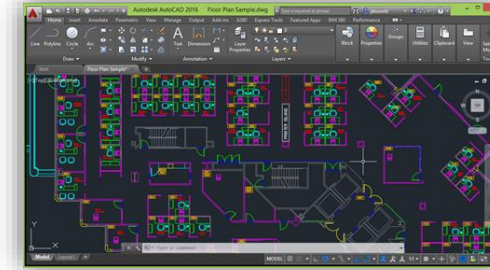
- Do you remember when? . . .



*Transformational Technologies become Emerging Technologies  
when we see the value they bring to the world*



# Emerging Technologies in Design-Build



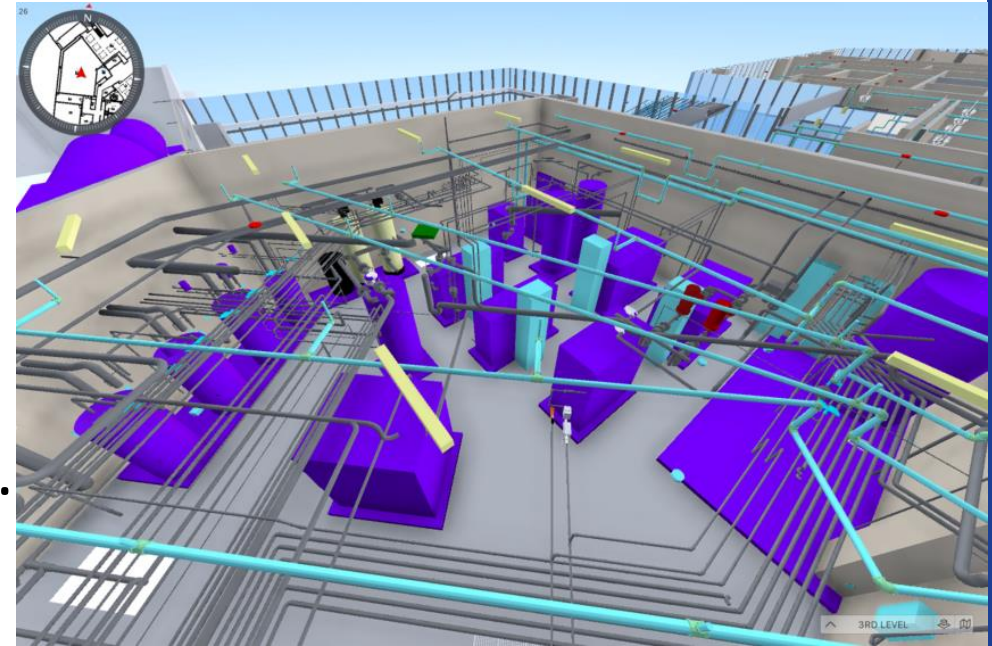
*Transformational Technologies become Emerging Technologies  
when we see the value they bring to the world*





# Emerging Technologies in Design-Build

- VR / AR
  - Huh, yeah! - What is it good for! . . . Absolutely Something!
- Technology Applications in the Field
  - To BIM or not to BIM
    - Spatial realities before they are real
  - BIM to FiM
    - Bringing the visual world to facilities maintenance
- Technology: It's all about Apps these days . . .
  - Meet Challenges & Streamline Resolutions
  - Leading Edge vs. the Bleeding Edge



- *Emerging Technologies that are well-suited in a DB world*





# Technology in Design (Build) from start to finish

Casey Mahon, AIA

**carrierjohnson + CULTURE**  
architecture + environments + brand strategy + graphics

*Digital Practice Manager  
AIASD Tech. in Practice Chair*





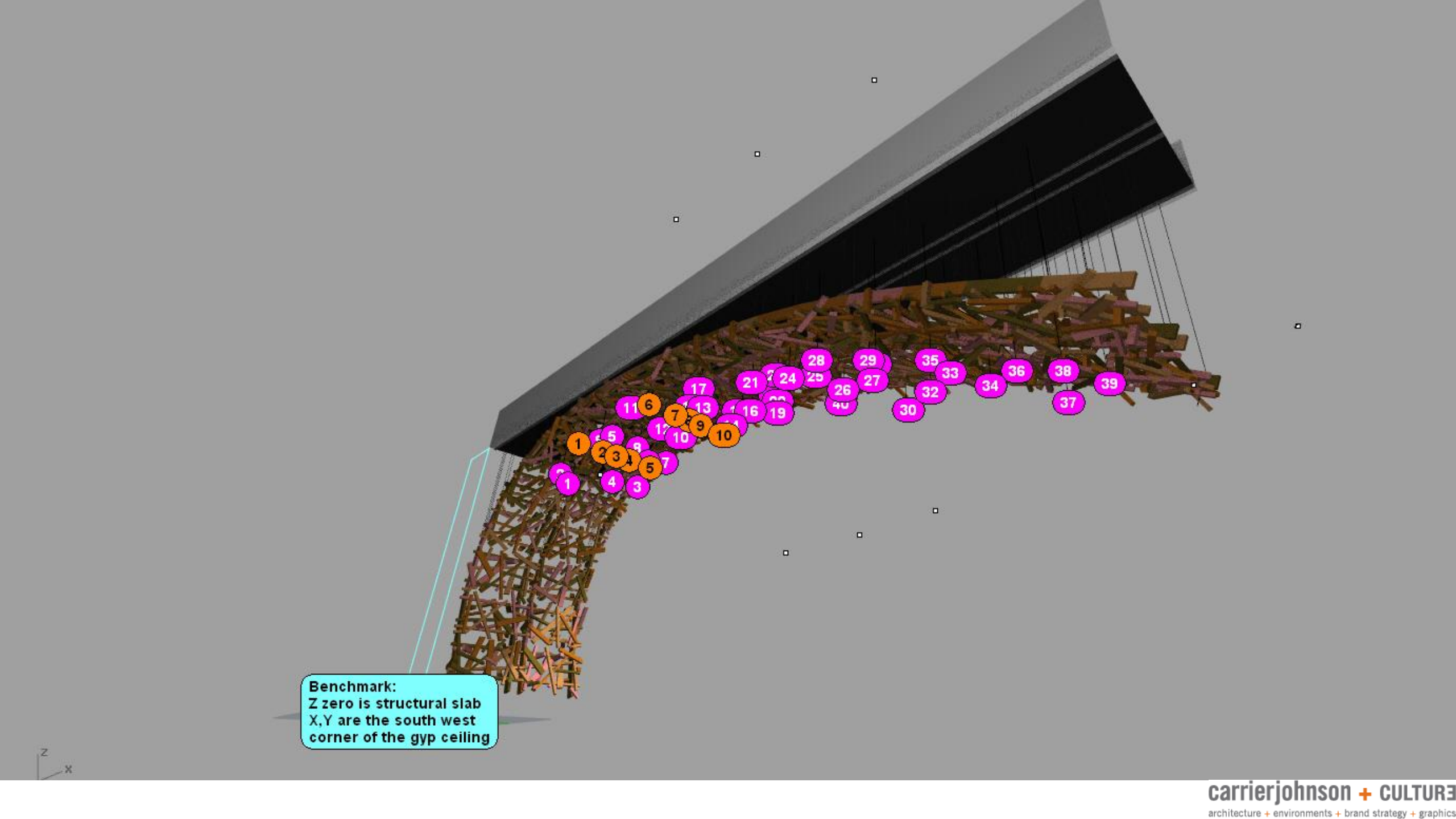






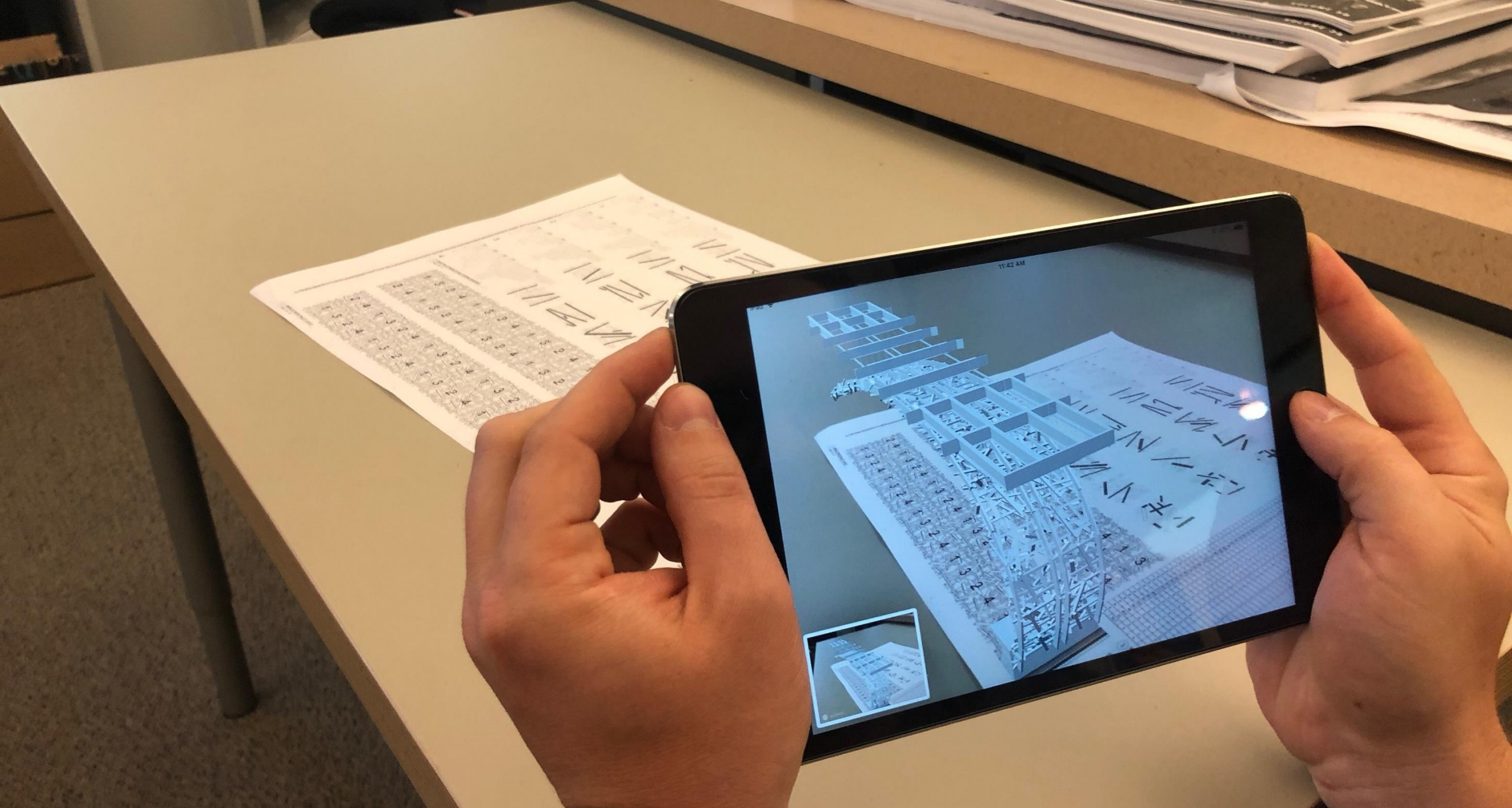






A 3D visualization of a structural slab, likely a ceiling, showing a dense network of brown, intersecting lines representing the structural grid. The slab is shown in a perspective view, sloping downwards from the top right towards the bottom left. A series of numbered points are distributed across the surface of the slab. The points are colored in two main groups: orange and pink. The orange points are numbered 1 through 10, and the pink points are numbered 1 through 40. The points are arranged in a somewhat regular pattern, following the curvature of the slab. A light blue rectangular box highlights a specific area on the left side of the slab. A small coordinate system is visible in the bottom left corner, with axes labeled 'x' and 'z'.

**Benchmark:**  
Z zero is structural slab  
X,Y are the south west  
corner of the gyp ceiling









# Technology Applications in the Field

## INTENSIVE CARE



**MCCARTHY**





# Technology Applications in the Field

INTENSIVE CARE



**MCCARTHY**



# Technology Applications in the Field

## INTENSIVE CARE



**MCCARTHY**





# Technology Applications in the Field

## INTENSIVE CARE



**MCCARTHY**



# Technology Applications in the Field

## INTENSIVE CARE

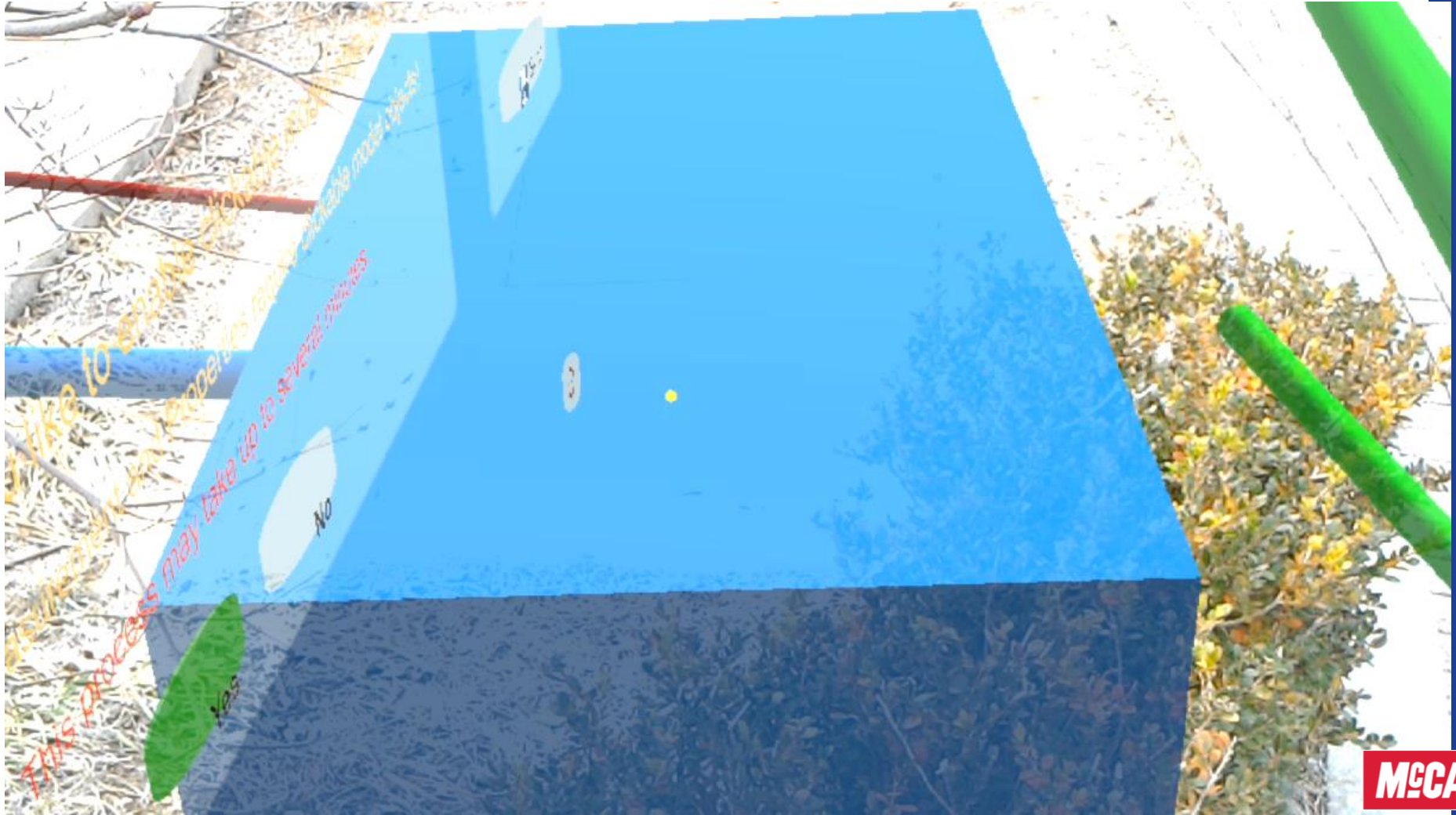
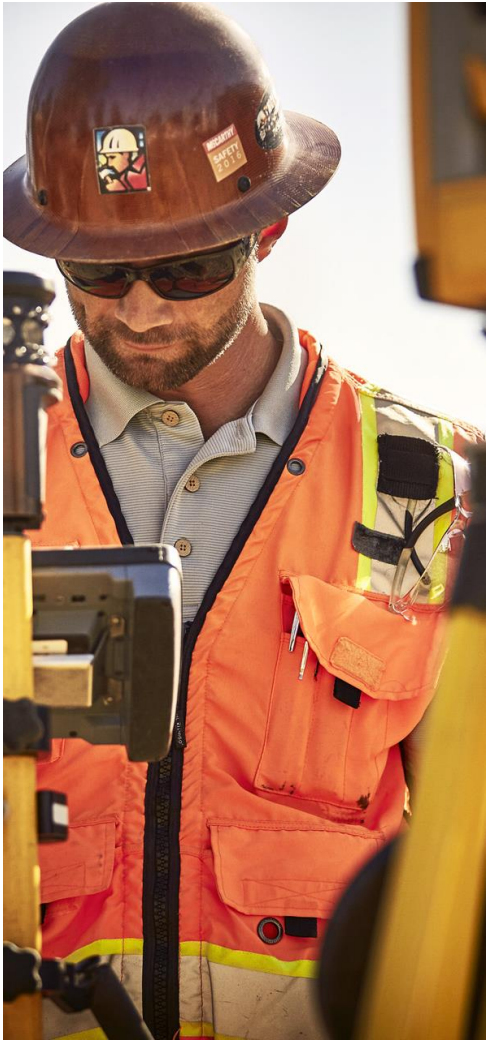


**MCCARTHY**





# Technology Applications in the Field



**MCCARTHY**





# Technology Applications in the Field

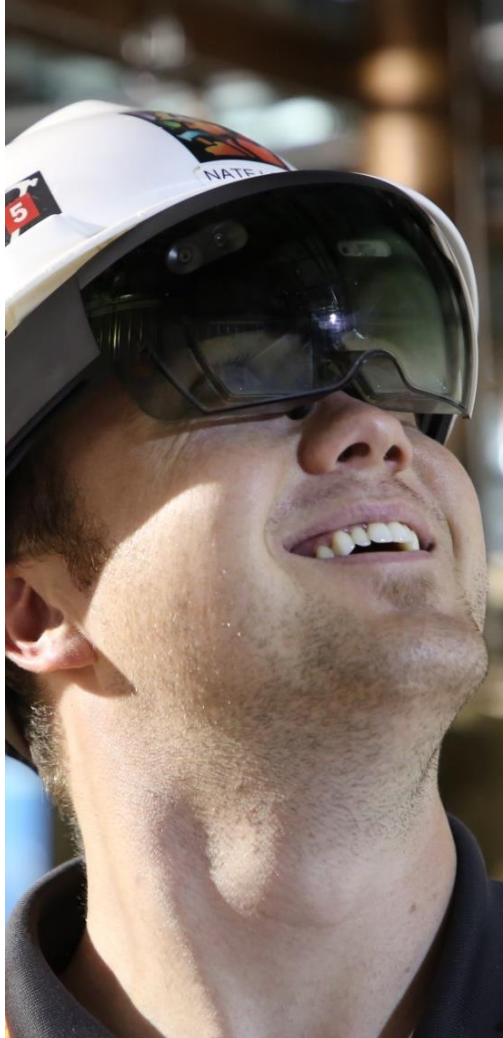


**MCCARTHY**





# Technology Applications in the Field



**MCCARTHY**



# Vertex Pharmaceuticals, San Diego

- 209,000 s.f. pharmaceutical R&D facility
- Construction Complete Spring 2018
- San Diego

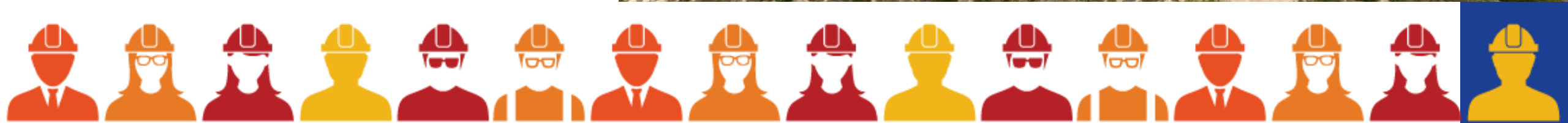


**DGA**

**LPA**



**BNB**  
BNBuilders





# Vertex Pharmaceuticals, San Diego



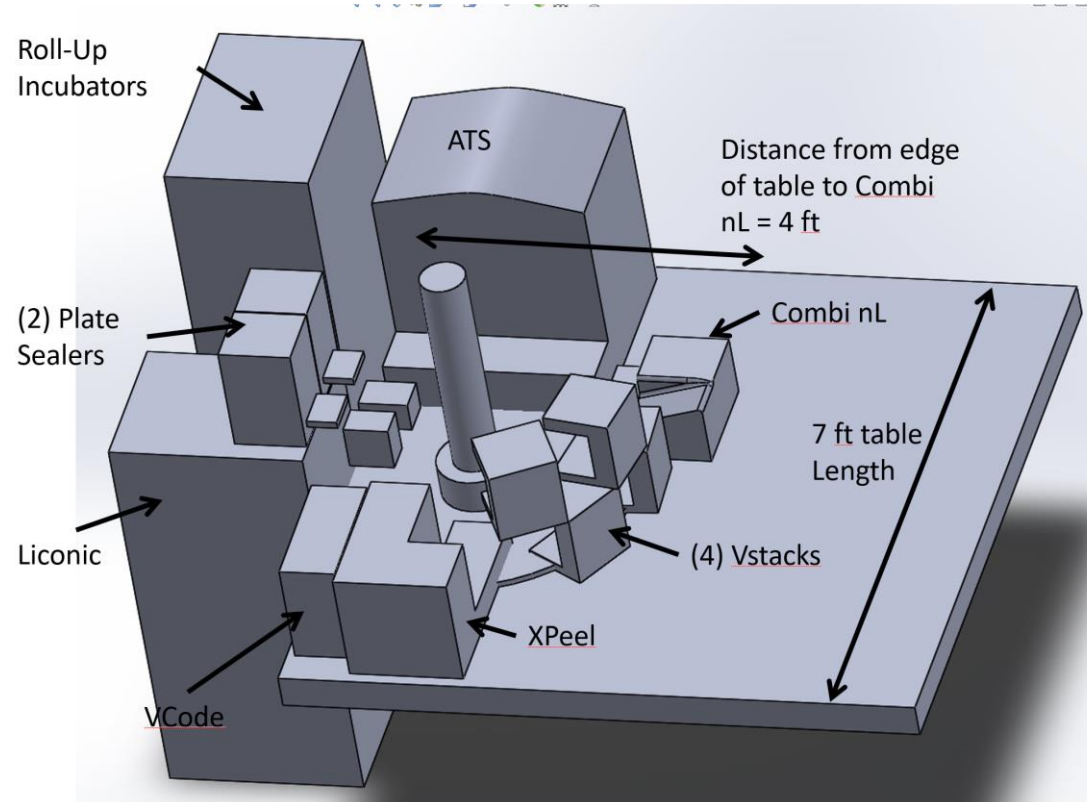
# Challenge

- Design is complete
- Laboratory equipment is costly to move
- Equipment isn't adding value when its not running





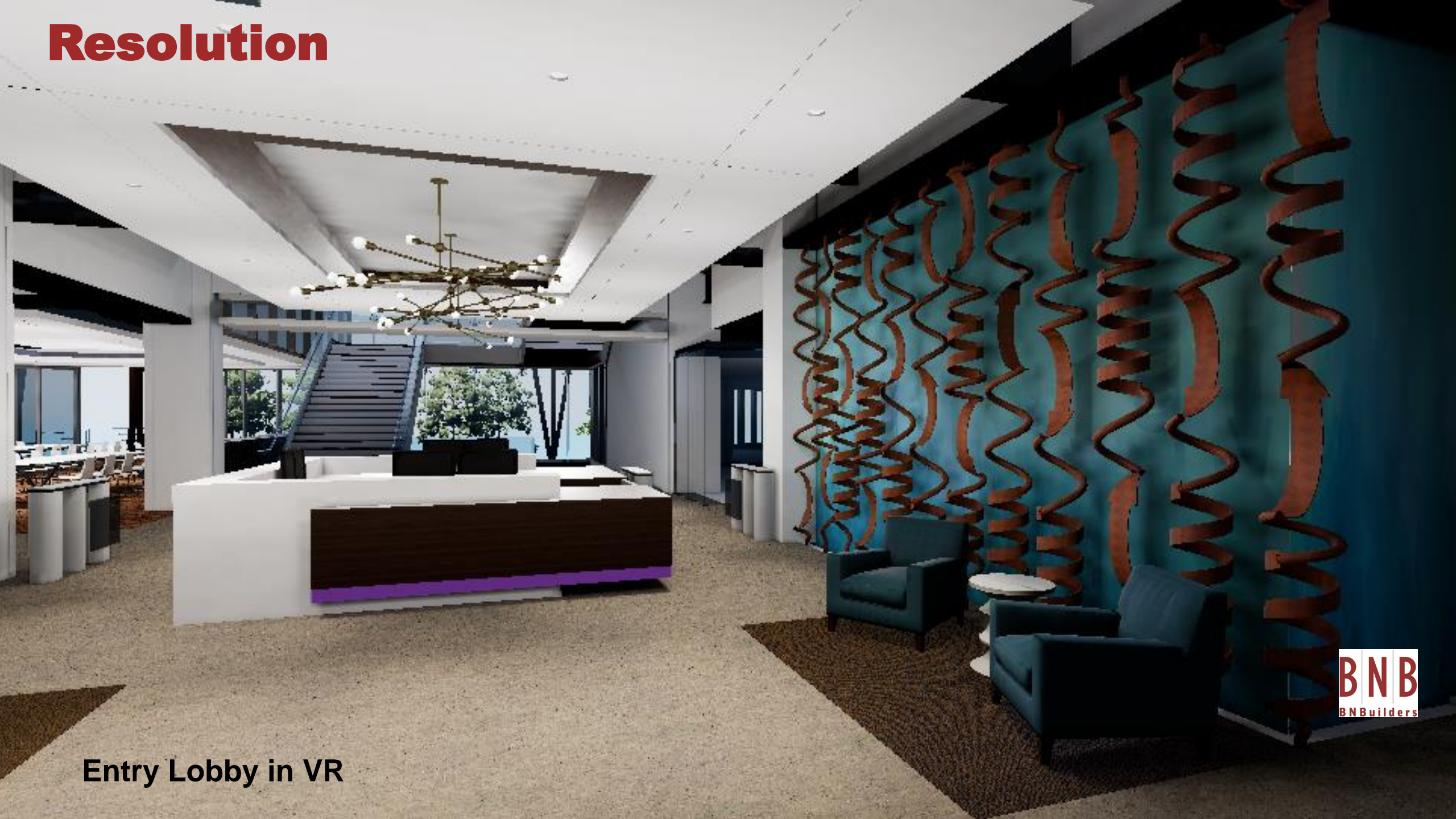
## Instrument Cluster



## Lab in VR



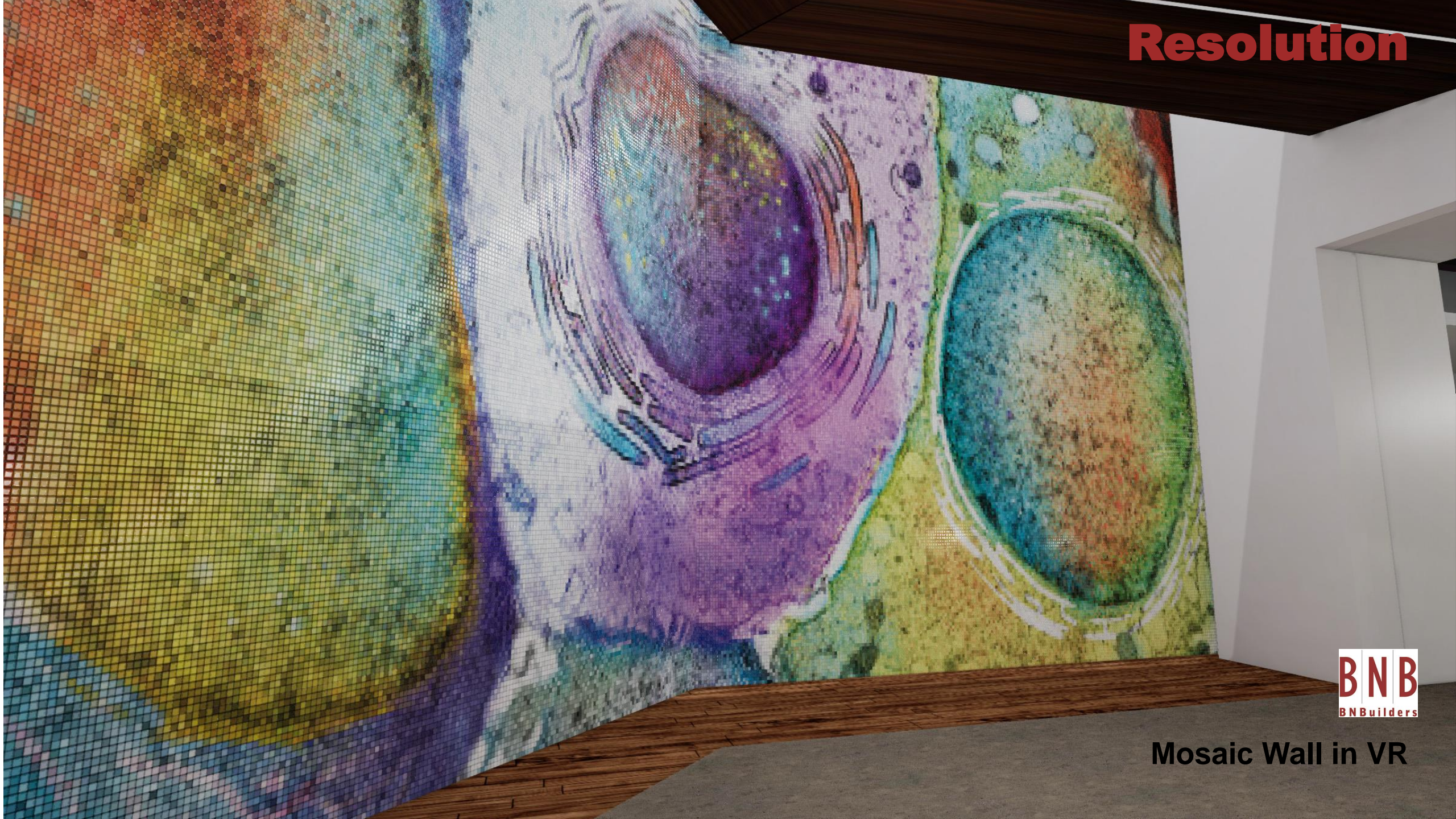
# Resolution



Entry Lobby in VR



**Resolution**





# Vertex will manage facility using BIM

VERTEX

Vertex > Projects > CURRENT - Vertex SD TI > Viewer > Vertex L2

Christopher Everist

CURRENT - Vertex SD TI

Help

Explorer

Views

Search

X

Q

< Spaces

1116 - OFFICE (SO)

1117 - OFFICE (SO)

1118 - BOOTH

1120 - INSTRUMENT

1121 - CHAMBERS

1122 - STORAGE

1123 - ANALYTICAL DEV

1124 - PUMPS

1125 - PROCESS CHEMISTRY

1126 - EQUIPMENT

1127 - SOLVENT

1128 - PP

1130 - GOWN

1130A - GOWN STORAGE

1131 - RESTRM

1132 - DISECT

1133 - PROCEDURE

1134 - PROCEDURE

1135 - HOLDING

1136 - HOLDING

1137 - SURGERY

1140 - ELEC

1141 - IDF

1201 - RESTROOM(W)

14 - 37 of 369 items

26

3RD LEVEL

VertexAssetType

VertexOwningDepartm...

Primary Service Provider

End of Life

Locations

2208 - UTILITY

Systems

No related systems

Type

011-6311-PU-04-02

Name

011-6311-PU-04

Description

Inline Pump

Model Number

4360 In-Line

Part Number

Replacement Cost

Asset Type

Organizations

Manufacturer

Armstrong Fluid Technology

Contractor

Designer

Warranty

Guarantor labor

Duration labor

Guarantor parts

Duration parts

Classification

OmniClass

23-27 17 00 Pumps

Vertex System

VertexSystem

Identification

Class

Component

Attributes

Documents

Issues

Affects

Send feedback

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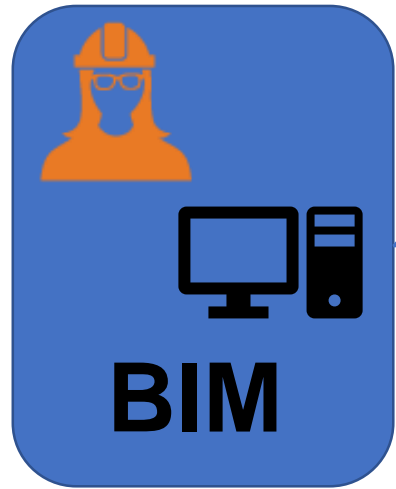




# Challenge

- Define scope
- Sharing model

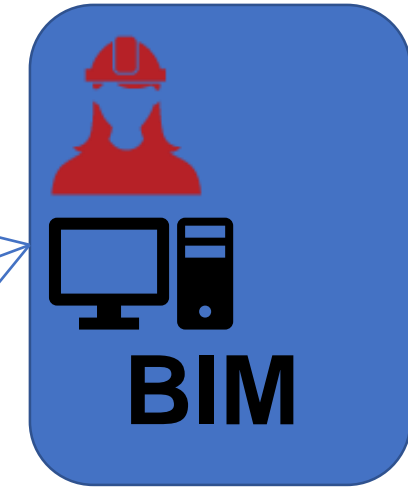
ELECTRICAL TRADE



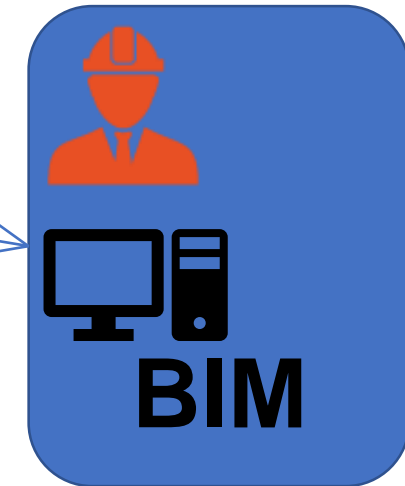
FACILITY MANAGER



CONTRACTOR



MECHANICAL TRADE




# Proposed Resolution

- COBie specification defines
  - Assets organization by programmatic space
  - Key identifying attributes
  - Naming convention
  - Phased Attribute Entry
  - Parties enter information







# Resolution




LOD  
Planner



Plan



Scope



Flow

Project Dashboard

Asset Management

Domestic Water Distribution

Sanitary Drainage

Process Support Plumbing Systems

Facility Fuel Systems


Heating Systems

## DEFINE STAGED DEVELOPMENT

Design Intent


Record Modeling

Special




PLM

Special




PLM


Special



Special

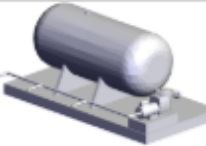


Special



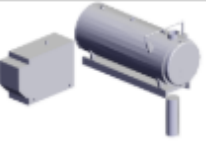
PLM

Special



PLM


Special





PLM




# Resolution

 LOD Planner

 Plan

 Scope

 Flow

Project Dashboard

Asset Management

Domestic Water Distribution

Sanitary Drainage

Process Support Plumbing Systems

Facility Fuel Systems

Heating Systems

Design Intent

Record M

Special

PLM

Special

Special

Special

Special

Special

Special

Special

Special

Facility Power Generation

PLM

Special

Geometry:

Symbolic

Generic

Detailed Elements

Fabrication Components

Maturity:

LOA 10  
< 100mm / 5"

LOA 20  
< 50mm / 2"

LOA 30  
< 15mm / 5/8"

LOA 40  
< 5mm / 1/4"

LOA 50  
< 1mm / 1/16"

As-Built

Instance Description

Instance Description

✎

Omniclass Number

Omniclass Number

✎

System

Domestic Cold Water

✎

Amps LPG

✎

Amps NG

✎

Fuel Consumption LPG cu ft/hr (gal/hr)

✎

Define Attributes

Done

BNB  
BNBuilders



**FIRM A**  
**Resolution**  
CHICAGO LAN

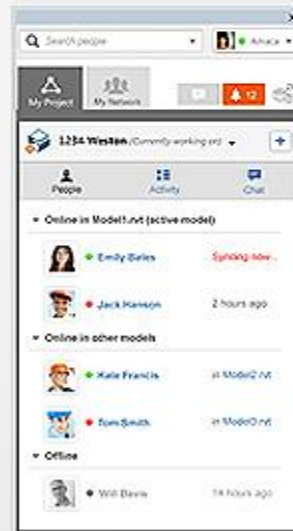


AUTODESK® 360

**FIRM B**



BOSTON LAN



# Emerging Technologies Fit The Design-Build World



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