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TLC ENGINEERING SOLUTIONS

Incorporating Smart Building Technology to Gain Efficiencies

Wisconsin Healthcare Engineering Association

ANNUAL CONFERENCE 10.01.24

Learning Objectives

1. Understand how to identify technology use cases early in the programming phase.
2. Gain perspectives on how technology can improve operational and clinical outcomes.
3. Identify strategies to enhance safety and security through technology.
4. Learn about reaching sustainability goals through smart building technology.

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Introductions

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Why Innovating with Technology Solves

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Healthcare Challenges

Technology Opportunities

The delivery of sustainable healthcare will continue to rely on innovation and technology solutions.

Understanding the root operational, clinical, and experiential processes is the most important step before integrating technology. The two are intertwined.

What are we solving for?

Where Technology Solutions have an impact today

- Safety/Security
- Sustainability
- Energy
- Efficiency/Ease of Operations
- Consumer Expectations
- Change Management

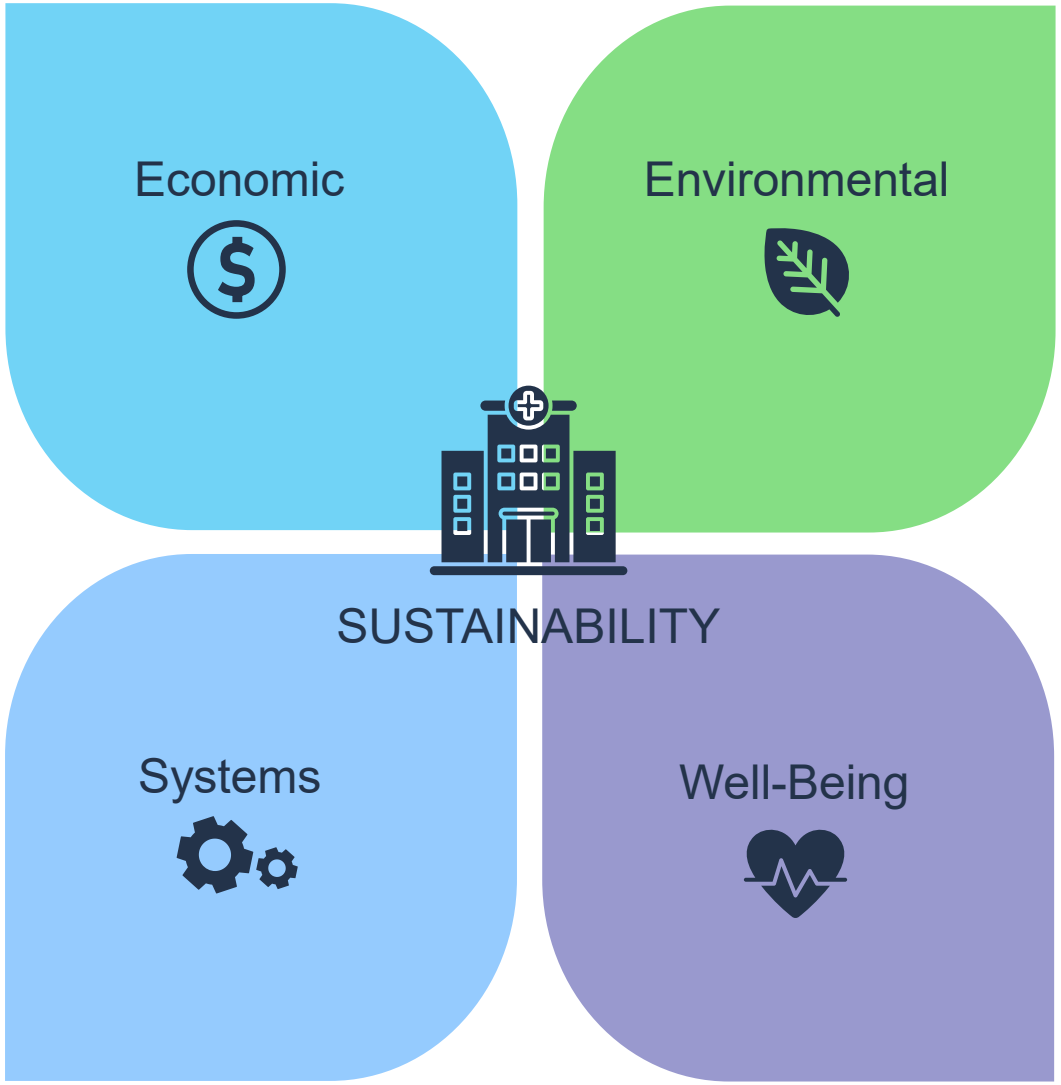
Safety/Security

An ideal patient and staff experience starts with a strong perception of safe environment.

Safety, includes secure access, patient safety, healthy work environment, operational hazards, infection control, and incident planning.

Sustainability & Resilience

- Improved efficiency and moderation in the use of materials, energy, waste production and the ecosystem at large
- Support health and well-being for all people - physical, mental, and emotional effects on building occupants and the surrounding community
- Minimize operational downtime



Energy

- Using less
- Controlling it
- Generating it
- Manage sources
  - Solar
  - Geothermal
  - Recycled

Efficiency & Ease of Operations

- Workflow - staff, information, and supply management
- Ease of facility operations supporting with less staff
- Automation, shift repetitive tasks – improve staff experience
- Technology can eliminate process waste

Consumer Expectations

- Expectations include access to more responsive relevant, and targeted communication and services.
- Curated and personalized experiences
- Digital access & automated prompts
- Do research, ask questions and buy services

Virtual Arrival Experience

Change Management

- Continuous change is our new reality
- Data informed proactive change management improves staff expereinces by understanding value
- Connecting people to the purpose of change identifies a common thread

Smart Building Trends for Healthcare

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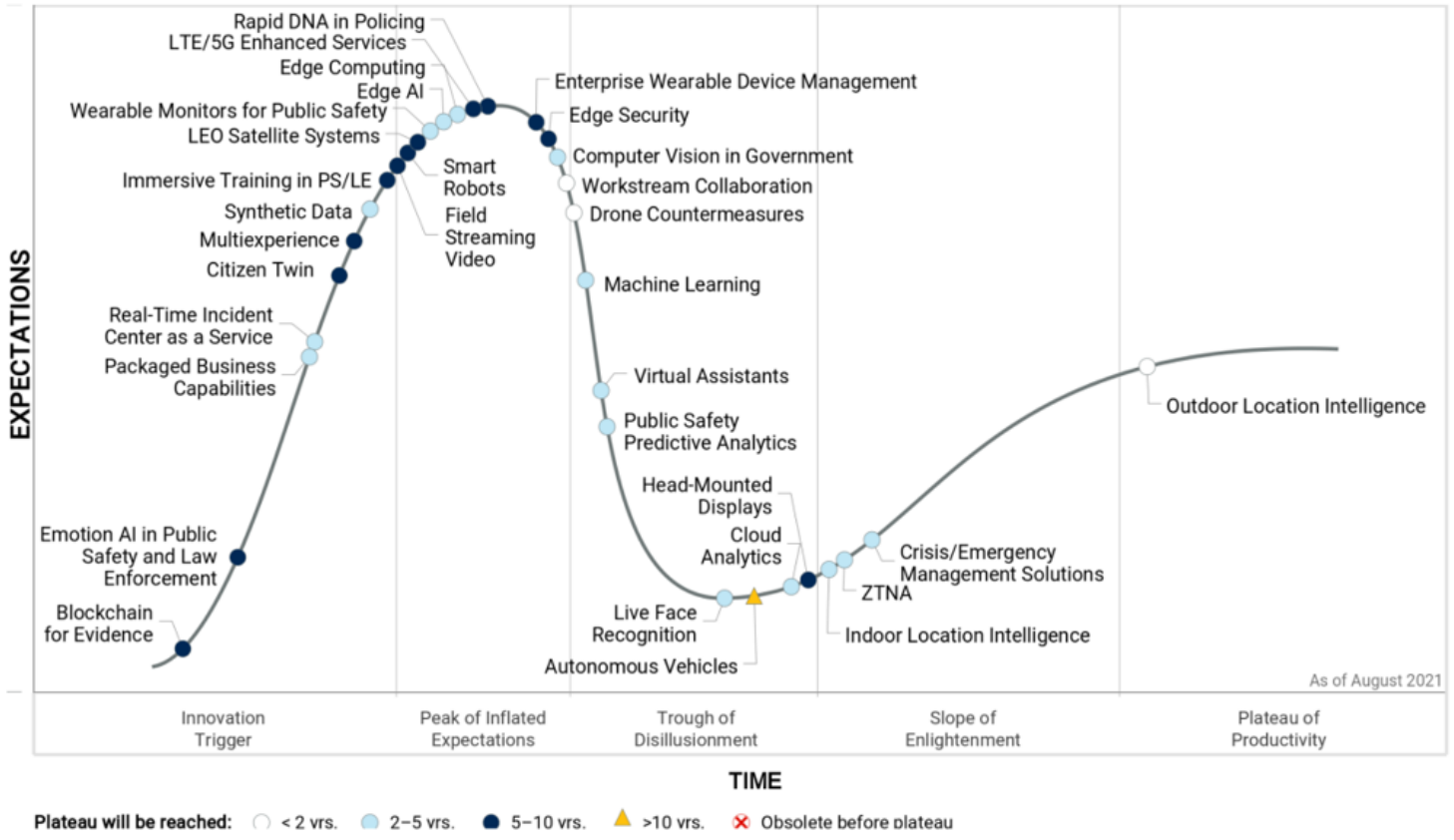
Technology to Support Healthcare Operations

- Patient Experience
- Staff Effectiveness
- Clinical/Operational Efficiency
- Communications

Technology Hype Cycle

Hype Cycle
for Real-Time Health
System Technologies,
2021



Source: Gartner

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Real Time Health System

Sources of Operational Intelligence

Diverse Data Sources

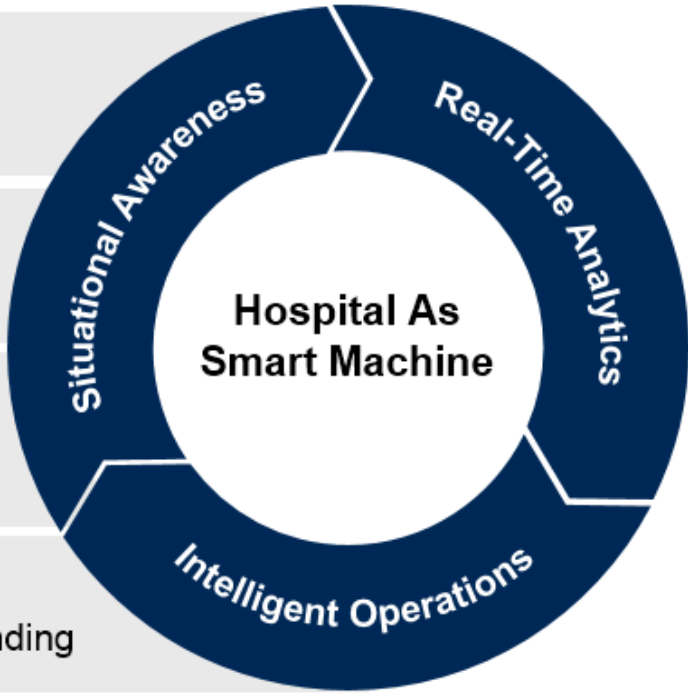
Patient: Registration, discharge, transitions of care, HL7 trigger events

Clinical: EHR, laboratory, pharmacy, medical imaging, ED, PHM, telemedicine

Clinical Ops: CC&C, nurse call, PTCM, IPC, patient monitoring, smart patient room, infection control, infant protection, bed management

Facility/Other: IoTH, location- and condition-sensing, CRM, supply chain, environmental monitoring, GPS, wayfinding

Real-Time Health System



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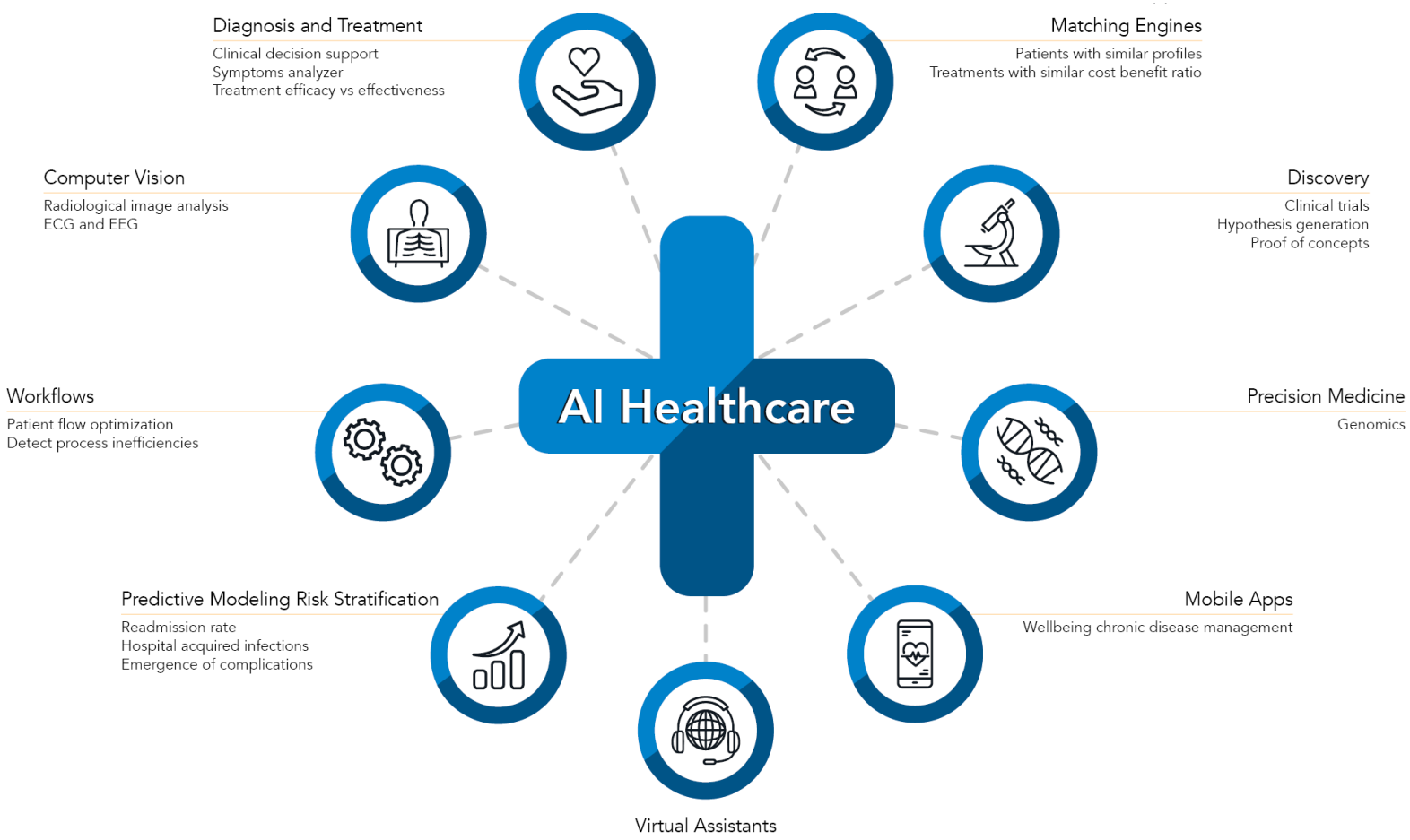
Artificial Intelligence

Applications of AI in Healthcare



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Next-Generation Smart Buildings

Incorporating numerous building technologies into our designs as they become network-capable, giving building owners the benefit of better building management.

Examples of smart-enabled systems include HVAC, lighting, temperature sensing, window shading, security, audio-visual systems, and health monitoring.

Digital Twins

Digital Twins are virtual representations of the real world that incorporate physical objects, processes, relationships, and behaviors.

Digital twins are used to represent accurate historical state, to observe and monitor performance, and to explore or predict future state.

Types of Digital Twins

LEVEL 1: DESCRIPTIVE

The descriptive twin is a visual replica with live, editable design and construction data, including 3D models and BIM.

LEVEL 2: INFORMATIVE

The informative twin uses increased integration with sensors and operations data for insights at any given time.

LEVEL 3: PREDICTIVE

The predictive twin captures real-time data, contextual data, and analytics to identify potential issues.

LEVEL 4: COMPREHENSIVE

The comprehensive twin leverages advanced modeling and simulation for potential future scenarios as well as prescriptive analytics and recommendations.

LEVEL 5: AUTONOMOUS

The autonomous twin has the ability to learn and make decisions through artificial intelligence, while using advanced algorithms for simulation and 3D visualization.

Technology Transformation

Given that healthcare is largely a human endeavor, there are practical limits to just how “smart” and autonomous a healthcare system will become.

Understand the Client's Vision

- Patient Experience
- Culture

- Registration
- Clinical Collaboration

- Kiosks, Tablets, Apps
- Mobile Communications Devices

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Interactive Patient System

- Interactive TV
- Digital Screen Wall (footwall)
- iPad or Surface at bedside to order Meals
- Digital Whiteboard
- Camera in room for telehealth & virtual visitation
- Temperature, Lighting and Window Shade control
- Patient Status Monitor (outside room)

Virtual Care

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Patient Monitoring

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Real Time Locating Systems

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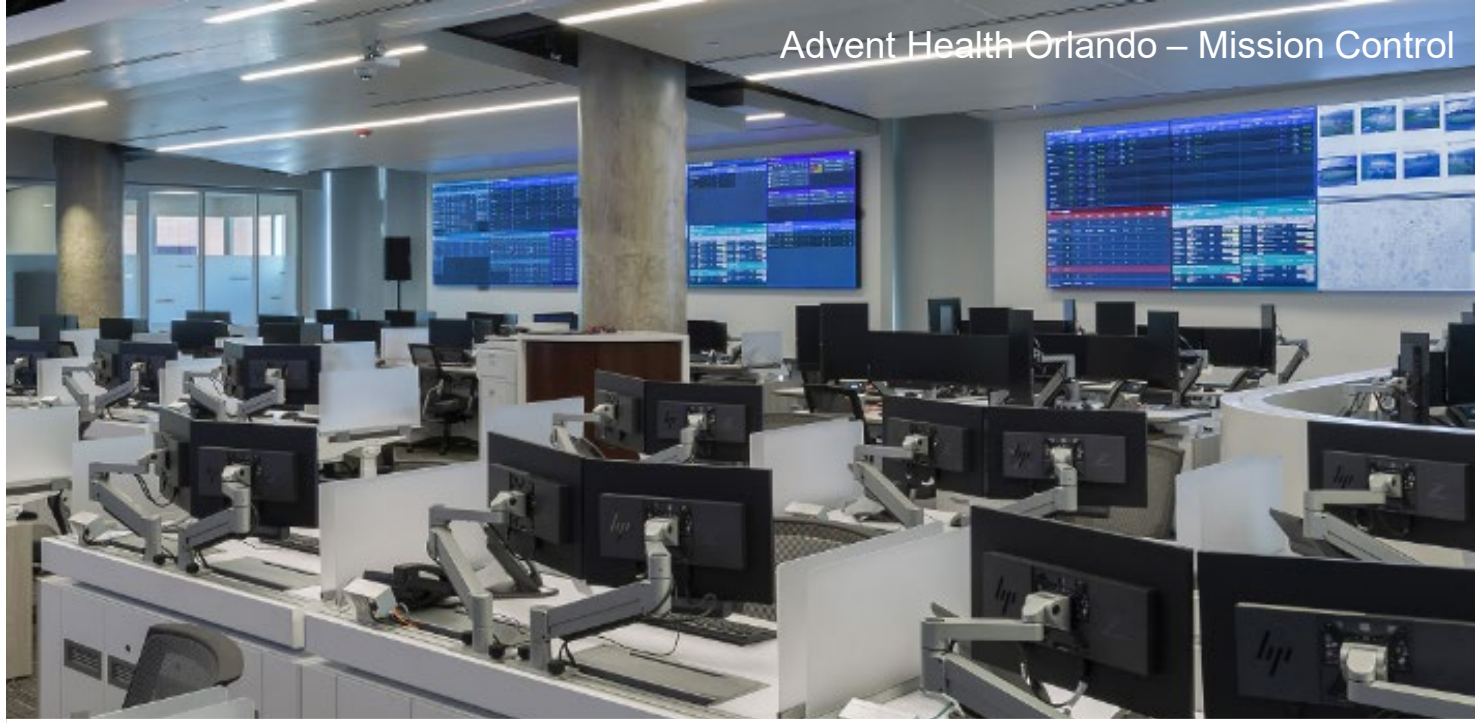
Patient Safety/ Advanced Security Screening

- AI enabled screening
- No need to remove bags
- Integrations with access control and video management solutions
- Portals can be leased

Clinical Command Center

- Clinical Decision Support
- Throughput Management
- Resource Allocation
- Remote Care
- Artificial Intelligence



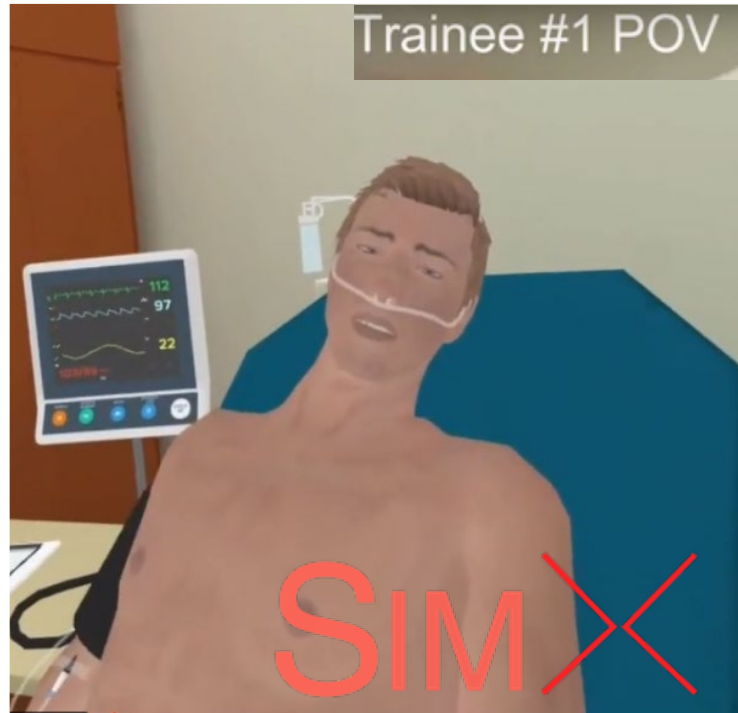
Advent Health Orlando – Mission Control

3D Printing

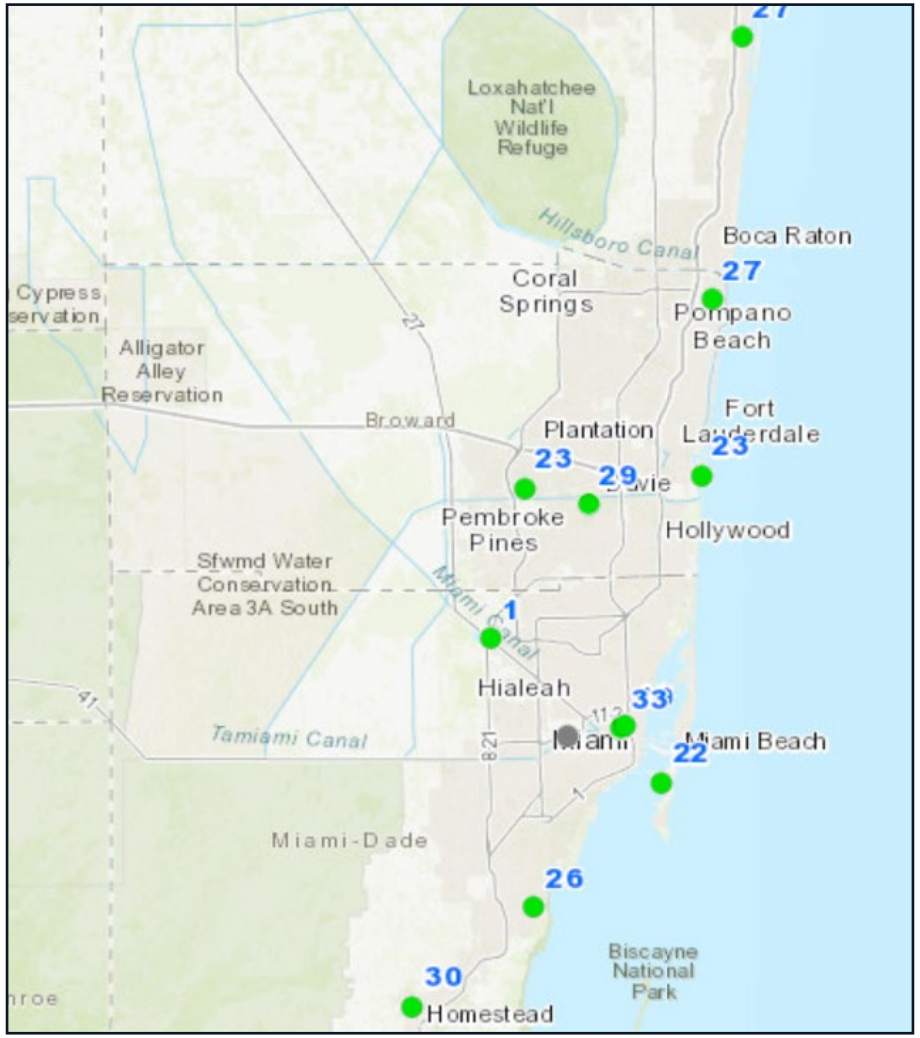
- Pre-surgical planning
- Custom joints and implants
- 3D Printing clean rooms

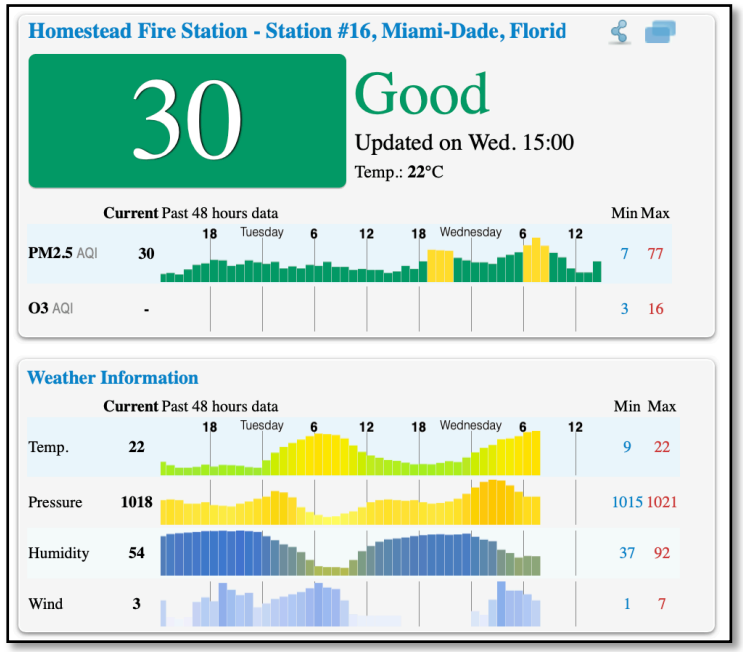
AR/VR Clinical Training

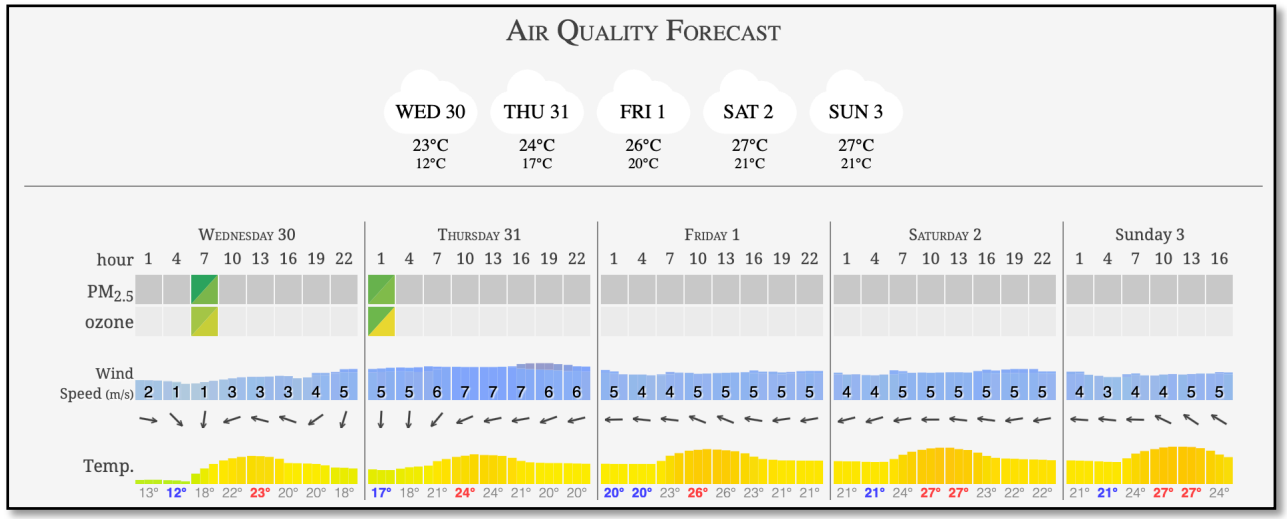
- Clinical Training
- Pre-Surgical Planning
- Portable or Fixed



WELL Buildings







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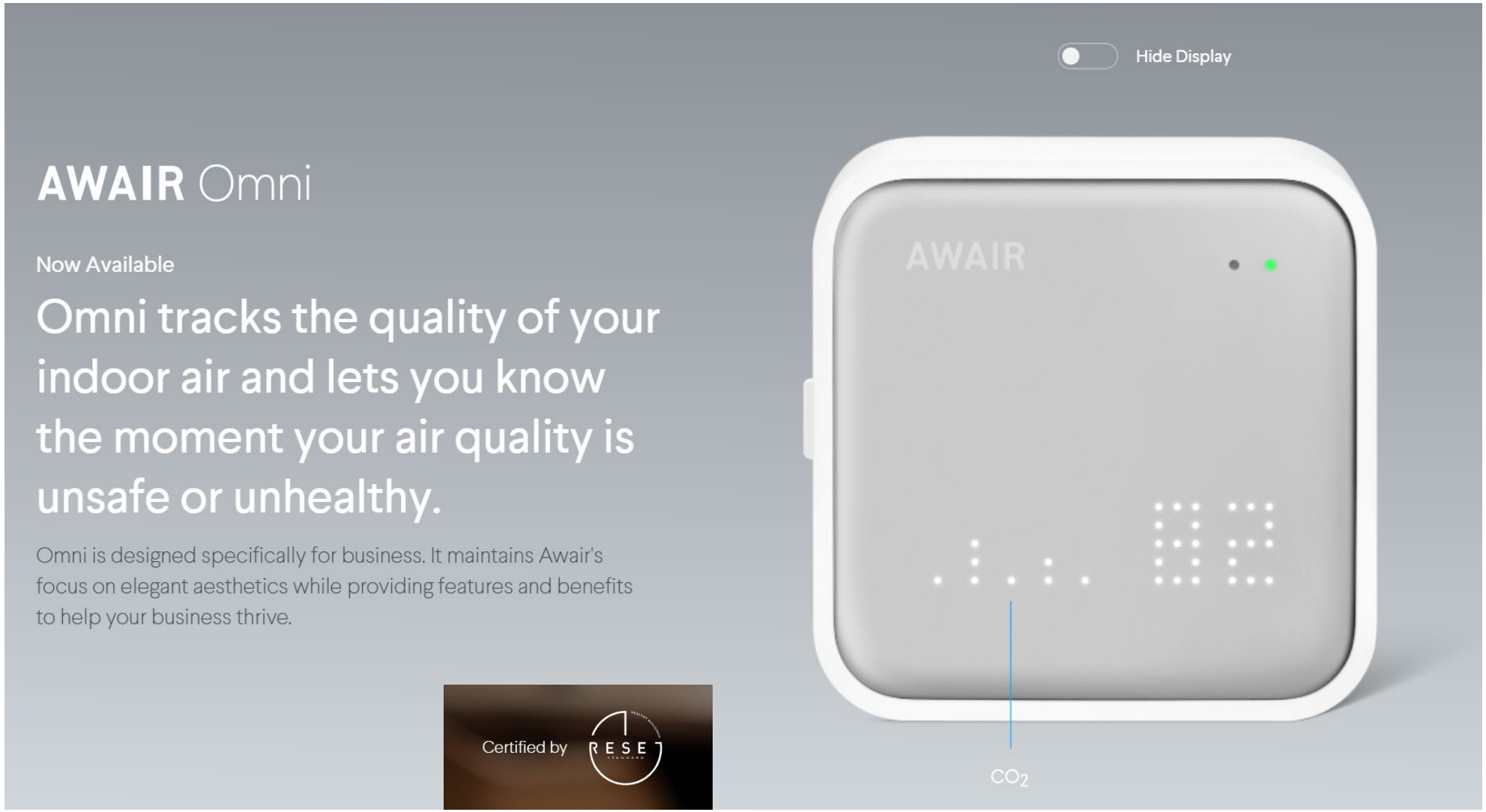
WELL Buildings



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How to Implement Future Ready Tech Solutions

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How We Get It Done

- Visioning
- Programming
- (Delegated) Design
- Target Budgeting
- Lessons Learned

Organizational Silos

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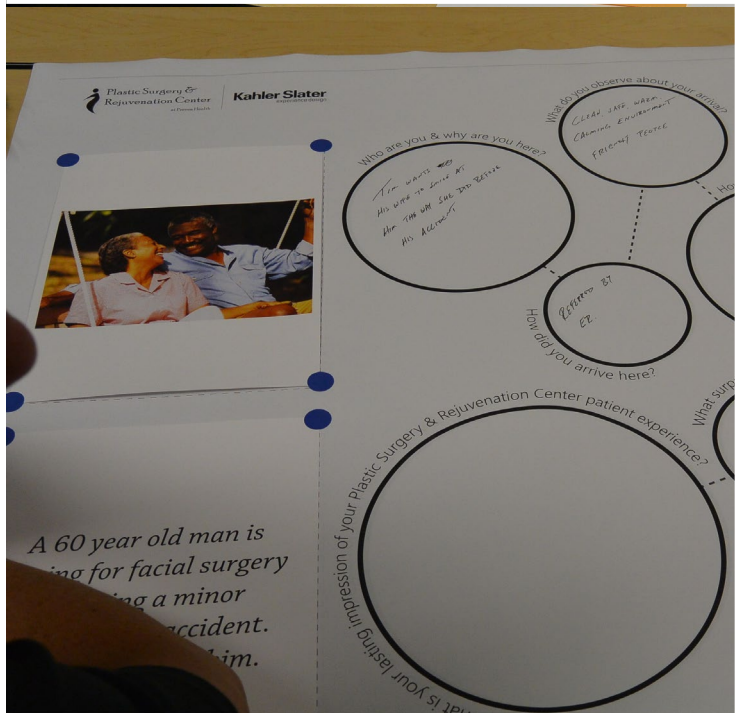
Visioning

- Mission
- Define Value & Align Goals
- Map Ideal Experiences
- Define Measurable Goals
- Strategies to Close the Gap
- Commitment
  - What is the R.O.I?
  - Costs more to add later
  - Operational $/sf

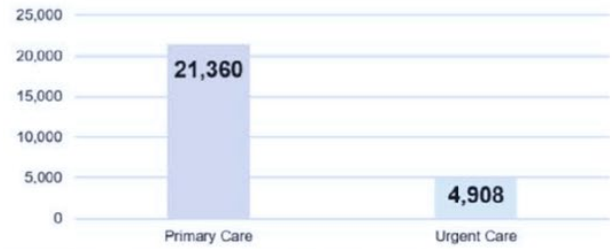


Programming

- What Space do we need?
- Clinical Volumes
  + Operations
  = Key Rooms
- Operational Narrative

DATA VALIDATION EXAMPLE

PRIMARY CLINIC Volumes and Key Room Needs

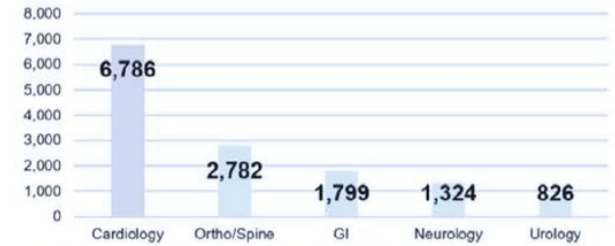


Source: Advisory Board Market Projections. Assumes 20% Market Share Capture.

KEY ROOM NEED BY CLINIC MODALITY (2030)

Modality	2030 Volumes	Avg LOS of Exam Visit	Utilization Assumption	Key Room Need
Primary Care Clinics	21,360	30 min	70%	8
Urgent Care Clinic Visits*	4,908	45-60 min	70%	2 to 3

SPECIALTY CLINIC Volumes and Key Room Needs



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KEY ROOM NEED BY CLINIC MODALITY (2030)

Modality	2030 Volumes	Avg LOS of Exam Visit	Utilization Assumption	Key Room Need
Cardiology Clinic Visits	6,786	30 min	70%	4
Flex Clinic Visits	6,731	30 min	70%	4

CLINICS	Key Room Need	New DGSF Space Requirement
Primary/Urgent Care	10 to 11	5,000
Cardiology	4	2,400
Nephrology/Internal Medicine	4	2,400
6 Infusion Chairs	1	2,700
Ortho/Neuro/GI/Urology	3	1,800
Procedure Rooms	2	600

DIAGNOSTIC IMAGING	Key Room Need	New DGSF Space Requirement
X-Ray	3	4,500
CT**	2	2,000
Ultrasound	3	3,600
MRI**	2	2,500
Mammography	1	1,000

STRESS LAB	Key Room Need	New DGSF Space Requirement
Echo	2	1,700

Total DGSF 45,700
Total BGSF ~55,000

PUBLIC AMENITIES STAFF SUPPORT	New DGSF Space Requirement
Lobby/Registrations	1,500
Cafe	1,500
Administrative	1,800
Staff Support	600

LAB	New DGSF Space Requirement
Laboratory Services	2,000

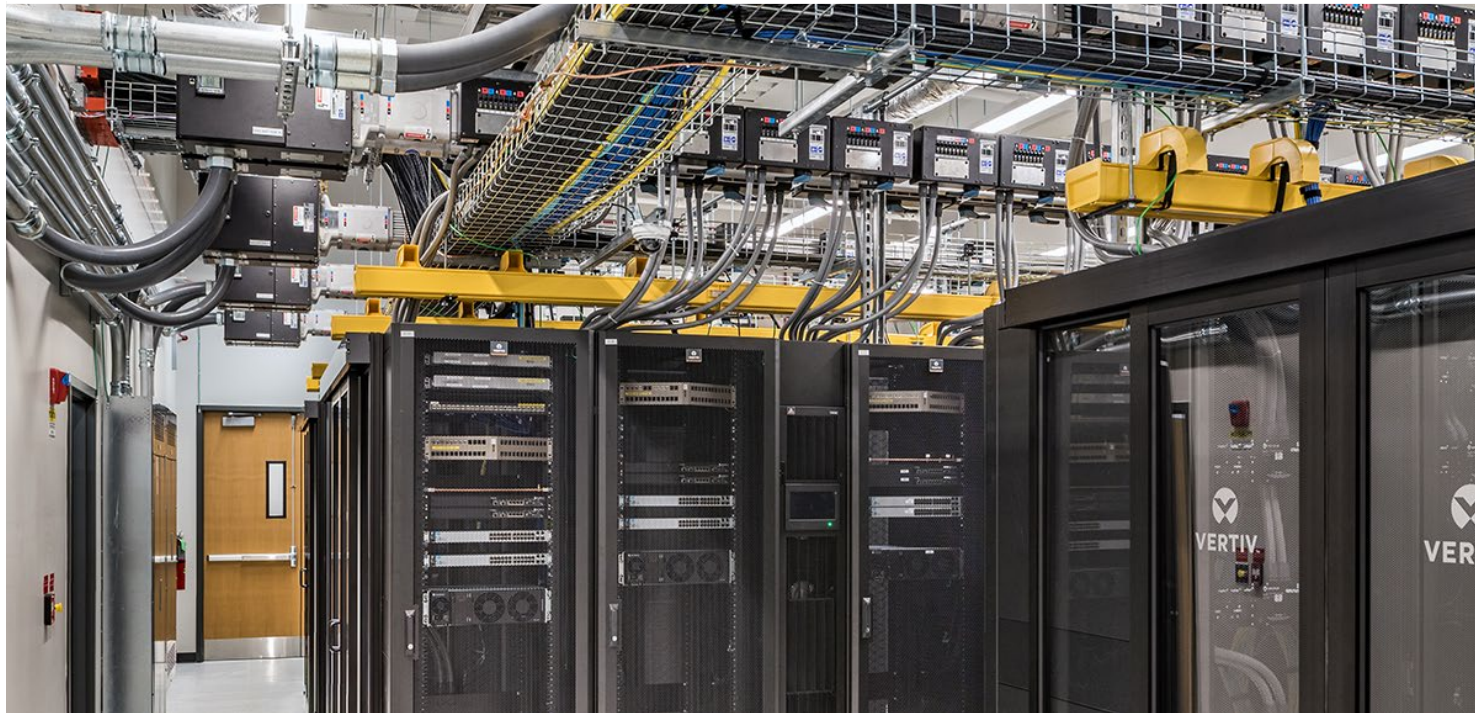
PHARMACY	New DGSF Space Requirement
Retail Pharmacy	2,000

BUILDING SUPPORT	New DGSF Space Requirement
Central Supply/Dock	1,800
Facilities/Maintenance	900
Mechanical	1,800

(Delegated) Design

Create simple schematics, narratives and/or Performance Specifications which are detailed and executed by the vendor.

- DAS
- Nurse Call
- Security Cameras
- Pneumatic Tube System
- RTLS

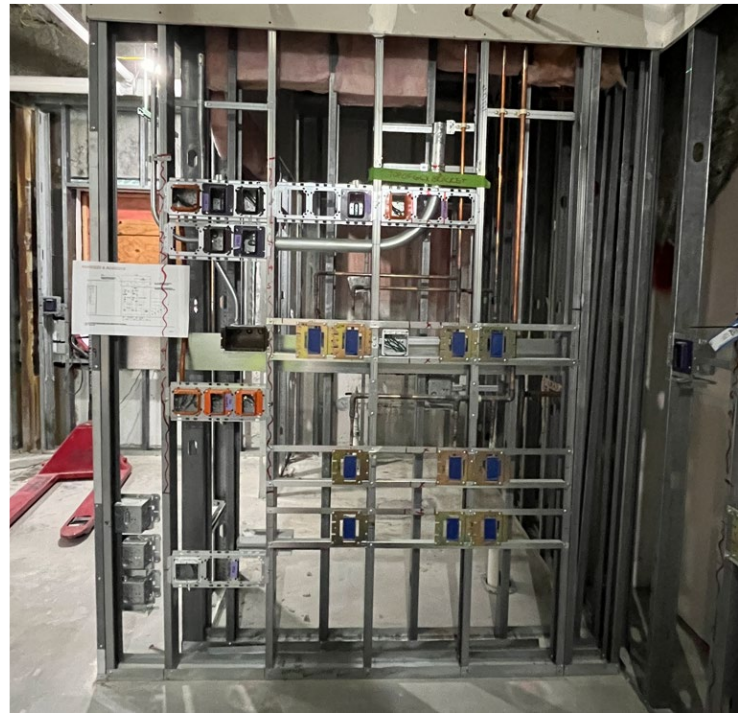


Budget

- Construction Budget AND Owner Budget ("soft costs")
- Engage the right people
  - Technology lingo is confusing to those outside of IT
- Software & System Integration
- Training
- Pilot Programs

Lesson Learned

- Factory or Site Tours
- Full Scale Mockups
- Virtual Reality
- Simulations / "sandbox"



Discussion

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