2019 AIRPORTS @ WORK

Building Information Management— Is the Technology Living Up to the Promise?

Grand Ballroom D

April 2 | 11:00am– 11:45am

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AIRPORTS COUNCIL INTERNATIONAL

Topics for Discussion

- How BIM has been utilized on large capital projects for design, efficiencies and collaboration
  - Massport
  - SLC
  - LAWA cBIM
  - Integration Considerations for BIM

Panel Participants

- Eddie Clayson, Director of Maintenance,
  Salt Lake City Department of Airports
- Frank Peters, cBIM Program Manager,
  Los Angeles World Airports
- Scott Yates, Chief Operating Officer,
  EDI, An Arora Company

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Massport's BIM Journey

Mark Ricketson, Program Manager-Design Technologies Integration Group
Massachusetts Port Authority

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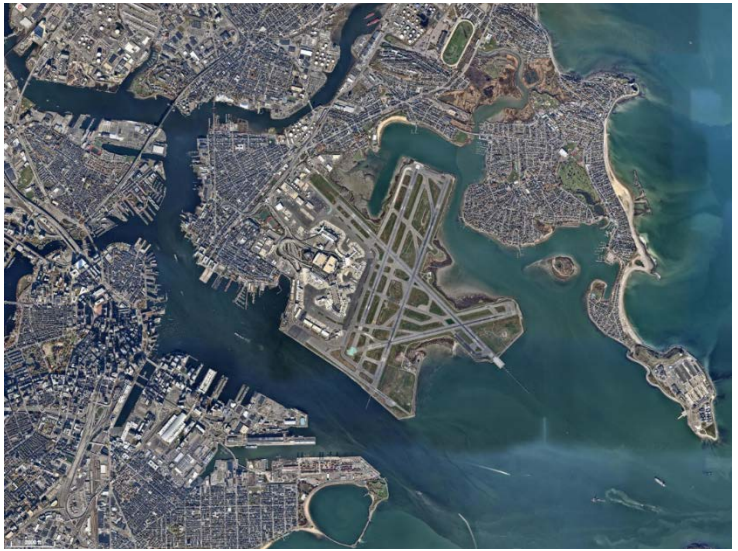
Massport

- Port Authority consists of Boston Logan, Worcester Regional Airport and Hanscom Field, Flynn Cruiseport Boston, Conley Terminal.
- Owns, manages, or ground leases approximately 585 acres of maritime, industrial and commercial waterfront property in South Boston, East Boston and Charlestown.
- Owns, operates and maintains more than 40 acres of parks and passive recreation land in the region.
- Logan International Airport sits on 1,700 acres of land.



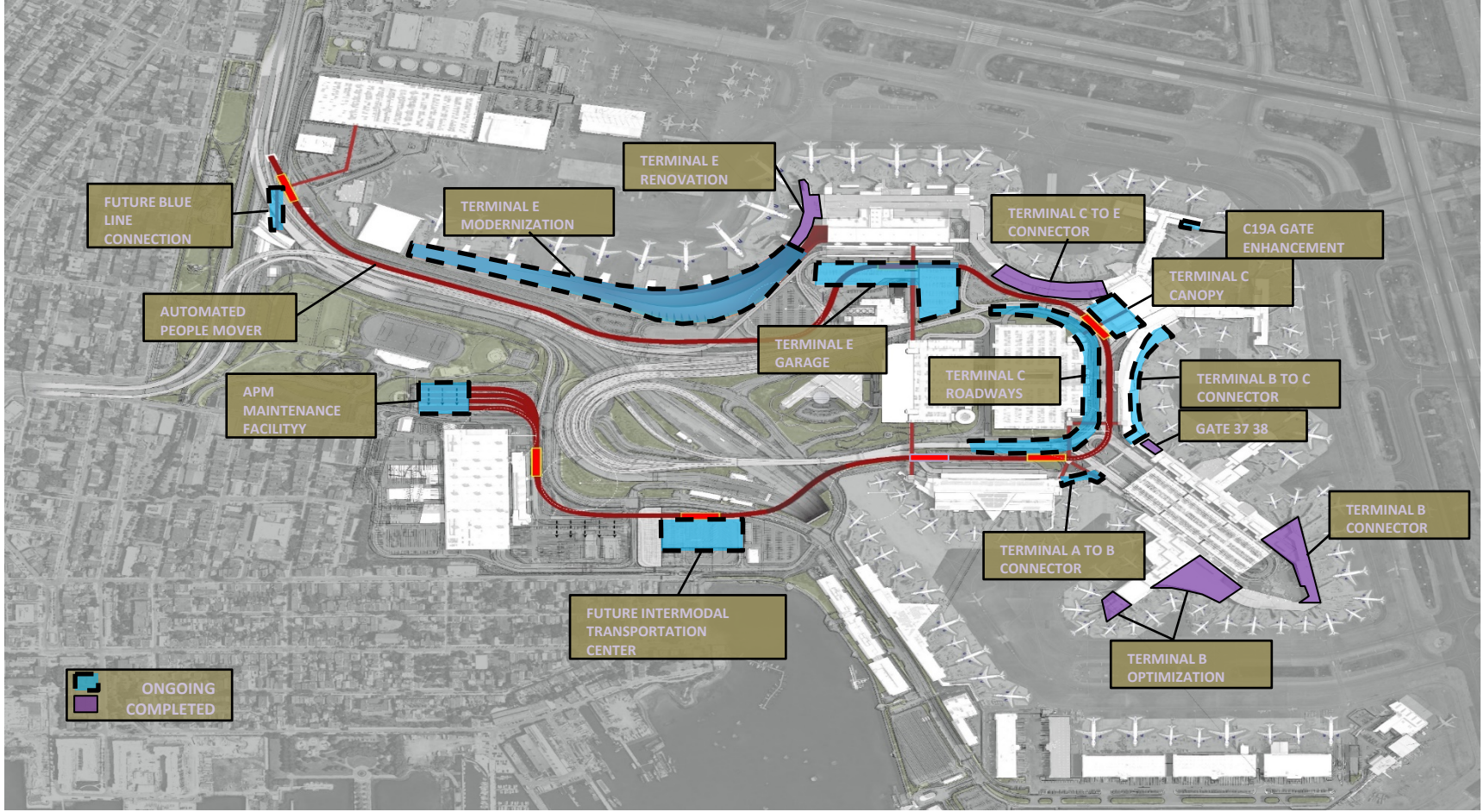
Department of Capital Programs & Environmental Affairs (CP&EA)

- Implements Massport's infrastructure investments overseeing a multi-billion dollar capital program
  - Aviation Projects
  - Maritime Projects
  - Land Development and Parks
  - Logan Express Facilities
- **Design Technologies Integration Group**
  - In support of Massport overall and these capital investment projects
  - CAD, GIS, BIM, Laser Scanning, Records Management

Three Approved Means to Deliver Projects

- **Design-Bid-Build**
  - Traditional public bidding method, choosing a contractor based on lowest responsive bid after the completion of design.
- **Design-Build (DB)**
  - Available for horizontal (civil works) projects over $5 Million.
- **Construction Manager at Risk (CM@Risk)**
  - Available for vertical projects over $5M as authorized by MGL Ch 149A.

BIM


FUTURE BLUE LINE CONNECTION
AUTOMATED PEOPLE MOVER
APM MAINTENANCE FACILITYY
TERMINAL E RENOVATION
TERMINAL E MODERNIZATION
TERMINAL E GARAGE
FUTURE INTERMODAL TRANSPORTATION CENTER
TERMINAL C TO E CONNECTOR
C19A GATE ENHANCEMENT
TERMINAL C CANOPY
TERMINAL C ROADWAYS
TERMINAL B TO C CONNECTOR
GATE 37 38
TERMINAL A TO B CONNECTOR
TERMINAL B CONNECTOR
TERMINAL B OPTIMIZATION
ONGOING
COMPLETED

Standards, Project Requirements and Deliverables

- Newly developed CAD standards based on National CAD Standards for all civil project
- Laser Scanning Guidelines and Requirements
- BIM Guidebook with a soon to be updated VDC/BIM Guide
  - All large capital projects – BIM is required for design, clash detection, project coordination and deliverables
  - A BIMxP (execution plan) is required
  - Lean Design and Construction along with BIM must be used in order to meet Conditions of Satisfaction (CoS) for a project

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BIM at Salt Lake City International Airport

Eddie Clayson, Director of Maintenance
Salt Lake City Department of Airports

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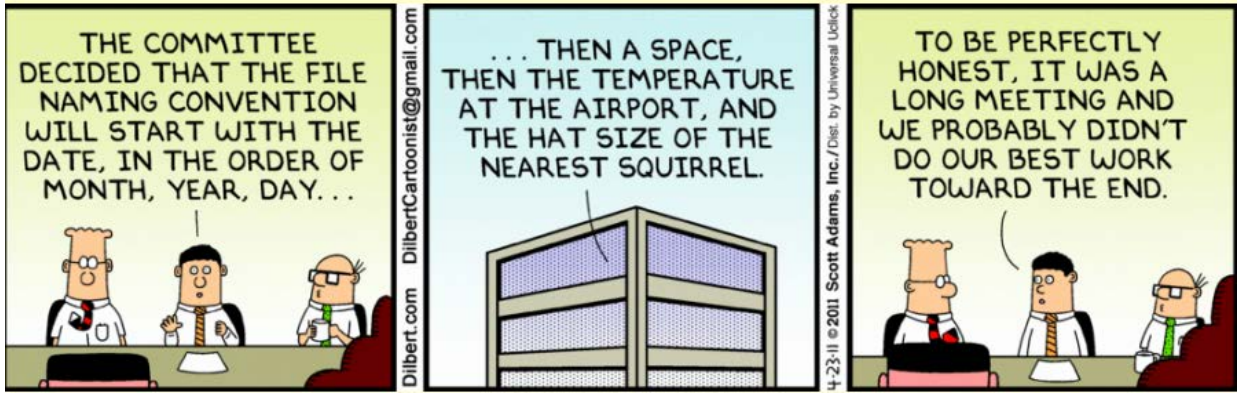
BIM Facilities Maintenance

BIM Facilities Maintenance



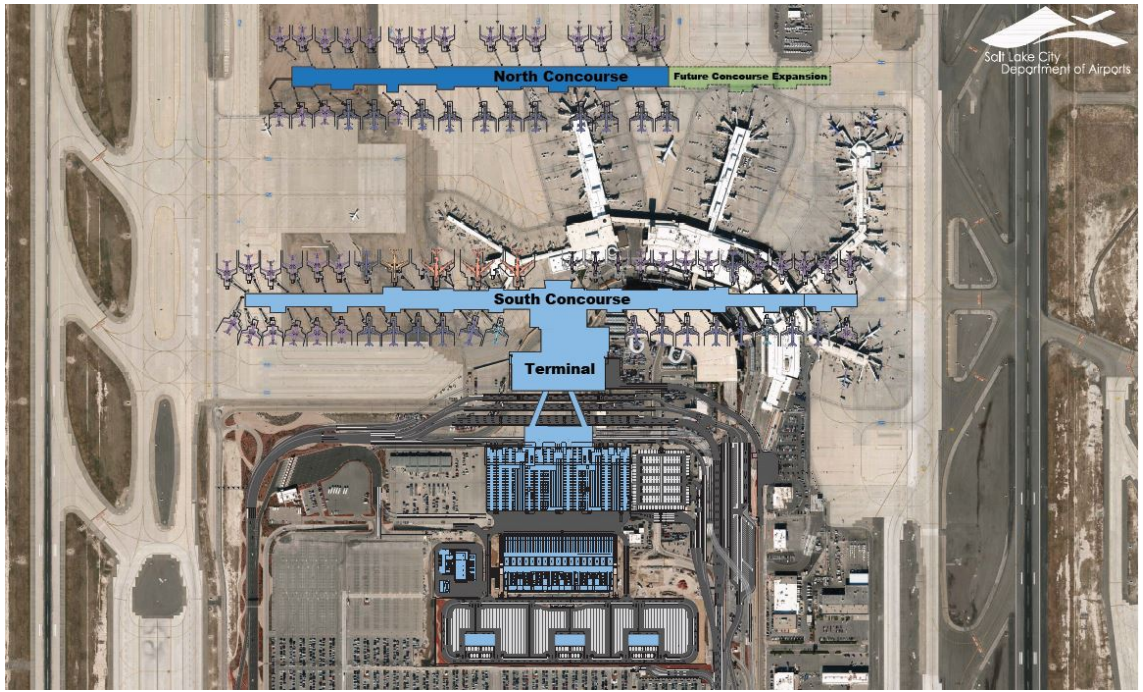
SLC Airport Redevelopment

Airport Redevelopment Program

Potential for BIM after construction

Challenges for Airport Maintenance

SLC Airport Redevelopment

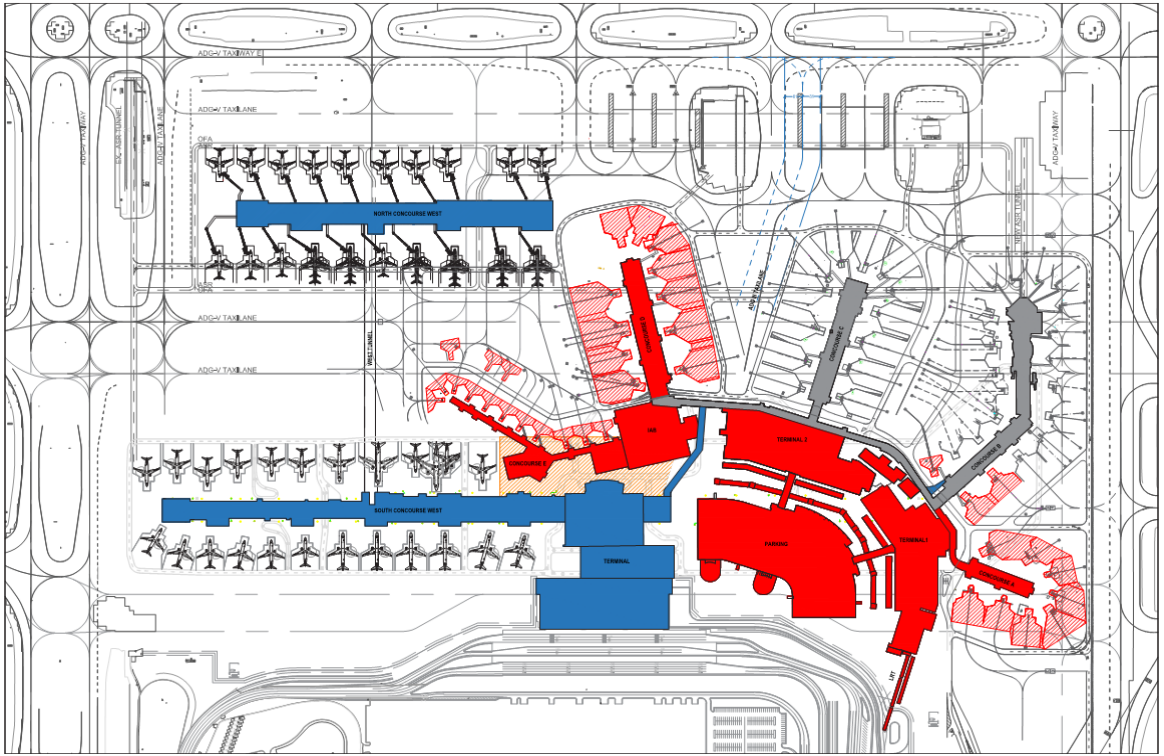


Phase 1 Opening
September 2020

Parking garage doubles

Phase 2 Early 2025

SLC Airport Redevelopment



6 miles of oversize conveyor

11 acres of Terrazzo

78 gates (71 current but only 56 PBB)
45 in Phase 1

Concourse nearly 1 mile from end to end

BIM Currently

Building Information Modeling for Airports
[ACRP 11-03 (Synthesis of Information Related to Airport Practices)]

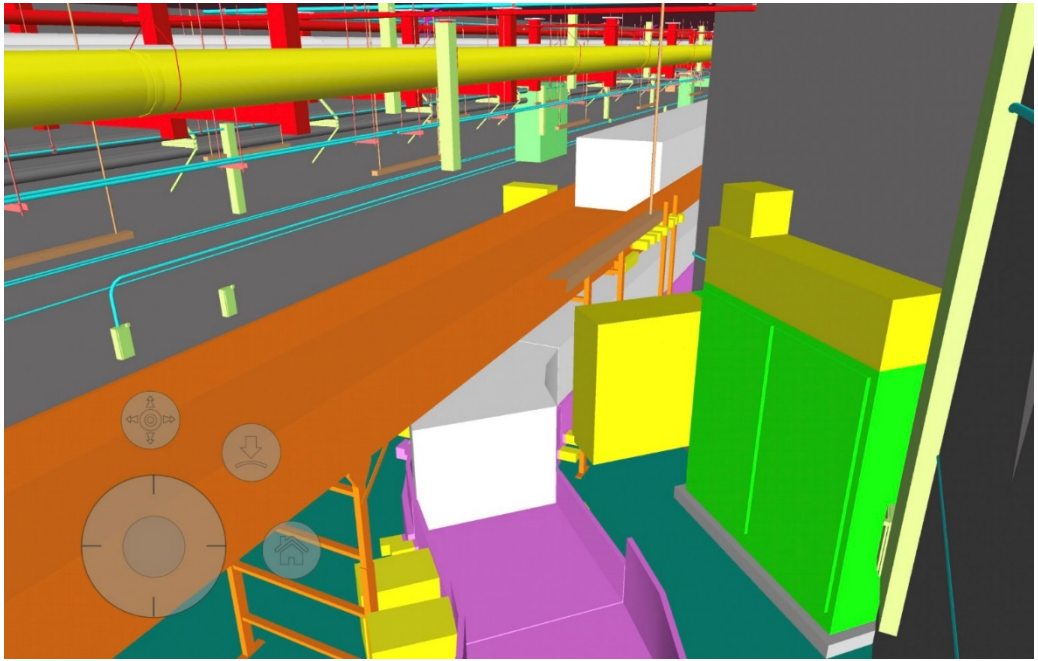
TRB's Airport Cooperative Research Program (ACRP) Synthesis 70: Building Information Modeling for Airports summarizes current state of the art and practice for Building Information Modeling (BIM). BIM is a digital representation of a facility's physical and functional characteristics. BIM offers tools that allow airport decision makers to understand all components of a facility—their location, and their attributes, both graphically and systematically—to minimize the total cost of owning and operating an ...

BIM Currently

ACRP 09-15 [Active]
Building Information Modeling (BIM) Beyond Design

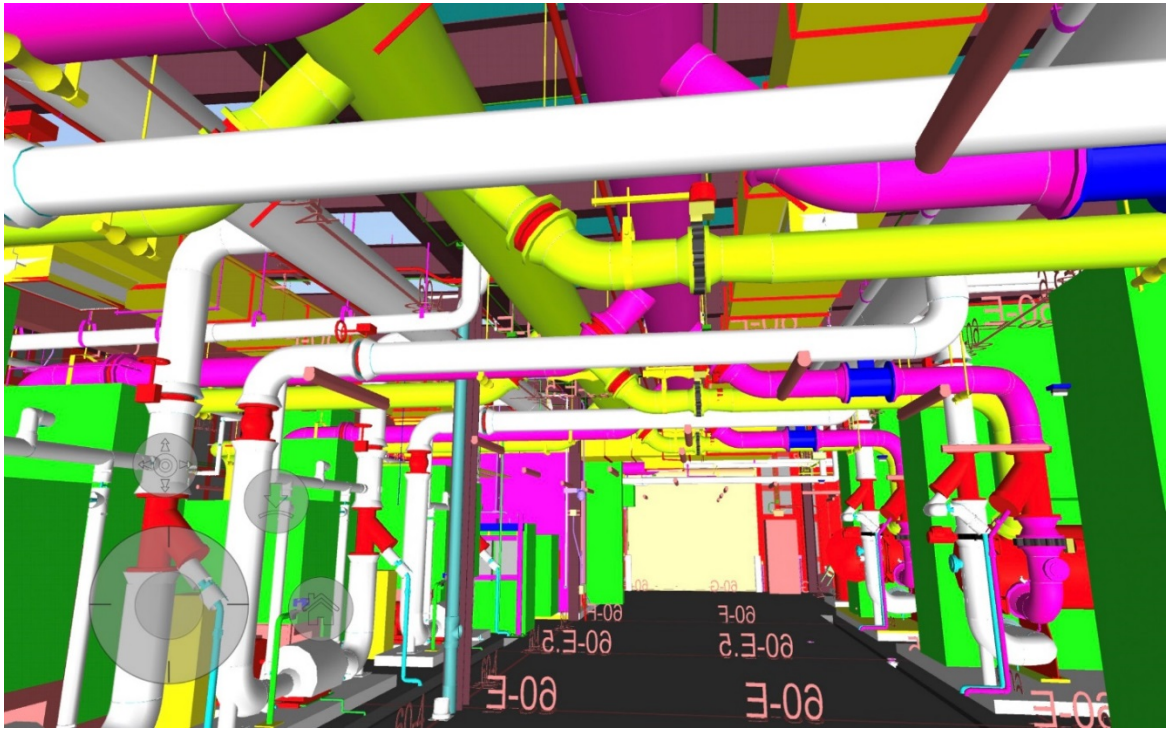
The guidance should address the following issues at a minimum:
- How to develop the business case and conduct a needs assessment;
- The expected ROI that may be able to be achieved for BIM beyond design;
- How to scale implementation of BIM;
- Who the stakeholders are and their roles;
- How to develop a BIM strategy;
- Outline the BIM process;
- How to integrate BIM into existing systems (i.e., technology architecture) and daily business processes/practices;
- How to determine the required data elements;
- How to prepare and develop staff for future BIM implementation;
- What are the progress metrics throughout implementation;
- How to determine BIM governance; and
- Legal and liability issues.

BIM Potential



“We’re not good at keeping up with buildings as they change over time”

BIM Potential



“BIM serves as a tool for keeping this information updated and accurate so that owners know what lies behind the walls.

BIM Challenges

LOD (What does the “I” represent?

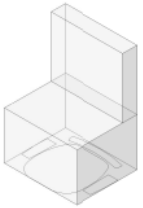
Manager

Accuracy

Doesn’t solve maintainability

BIM Challenges - LOD

LEVEL of DEVELOPMENT

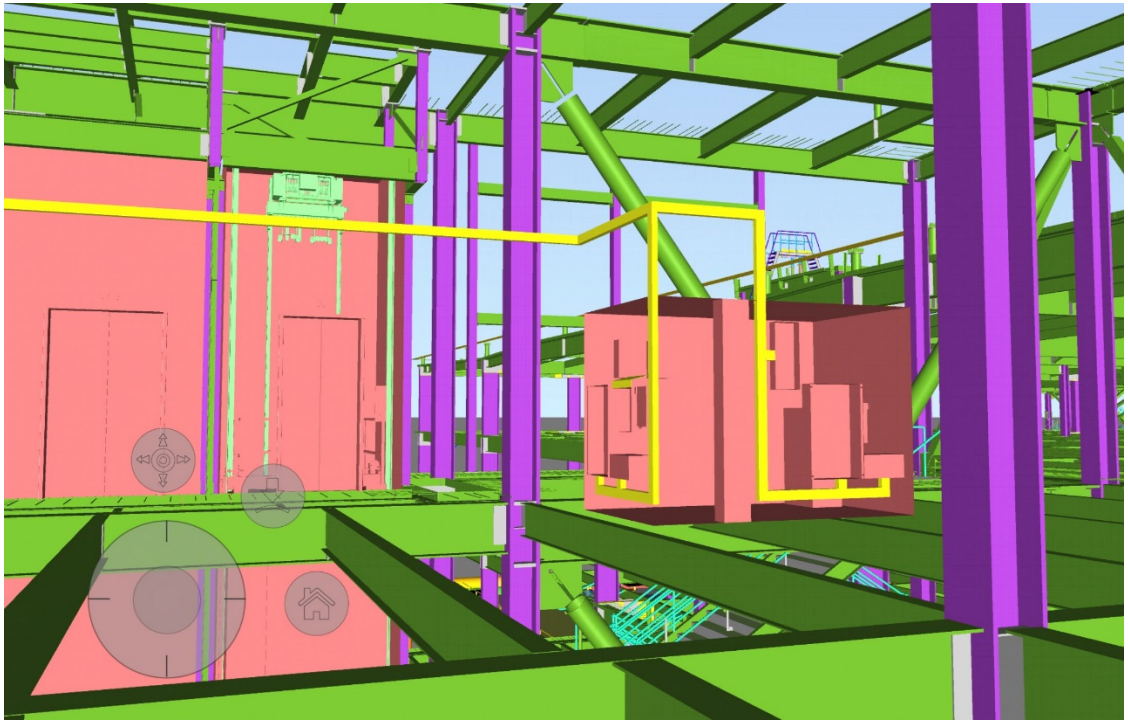
LOD 100	LOD 200	LOD 300	LOD 400	LOD 500
				
Concept (Presentation)	Design Development	Documentation	Construction	Facilities Management
DESCRIPTION: **Office Chair** Arms, Wheels WIDTH: DEPTH: HEIGHT: MANUFACTURER: Herman Miller, Inc. MODEL: Mirra LOD: **100**	DESCRIPTION: **Office Chair** Arms, Wheels WIDTH: **700** DEPTH: **450** HEIGHT: **1100** MANUFACTURER: Herman Miller, Inc. MODEL: Mirra LOD: **200**	DESCRIPTION: **Office Chair** **Arms, Wheels** WIDTH: **700** DEPTH: **450** HEIGHT: **1100** MANUFACTURER: Herman Miller, Inc. MODEL: Mirra LOD: **300**	DESCRIPTION: **Office Chair** **Arms, Wheels** WIDTH: **685** DEPTH: **430** HEIGHT: **1085** MANUFACTURER: **Herman Miller, Inc** MODEL: **Mirra** LOD: **400**	DESCRIPTION: **Office Chair** **Arms, Wheels** WIDTH: **685** DEPTH: **430** HEIGHT: **1085** MANUFACTURER: **Herman Miller, Inc** MODEL: **Mirra** PURCHASE DATE: **01/02/2013**

(Only data in **red** is useable)

BIM Challenges – Management

“The man who complains about the way the ball bounces is likely to be the one who dropped it.
Lou Holtz

BIM Challenges – Accuracy



Fast is fine, but accuracy is everything. Wyatt Earp

BIM Challenges – Accuracy

BIM Challenges – Maintainability

BIM Conclusion

Eddie Clayson
Salt Lake City Department of Airports
Director of Maintenance

Eddie.Clayson@slcgov.com

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*c*BIM @ LAX

Frank J Peters, Program Manager
Los Angeles World Airports, LAWA

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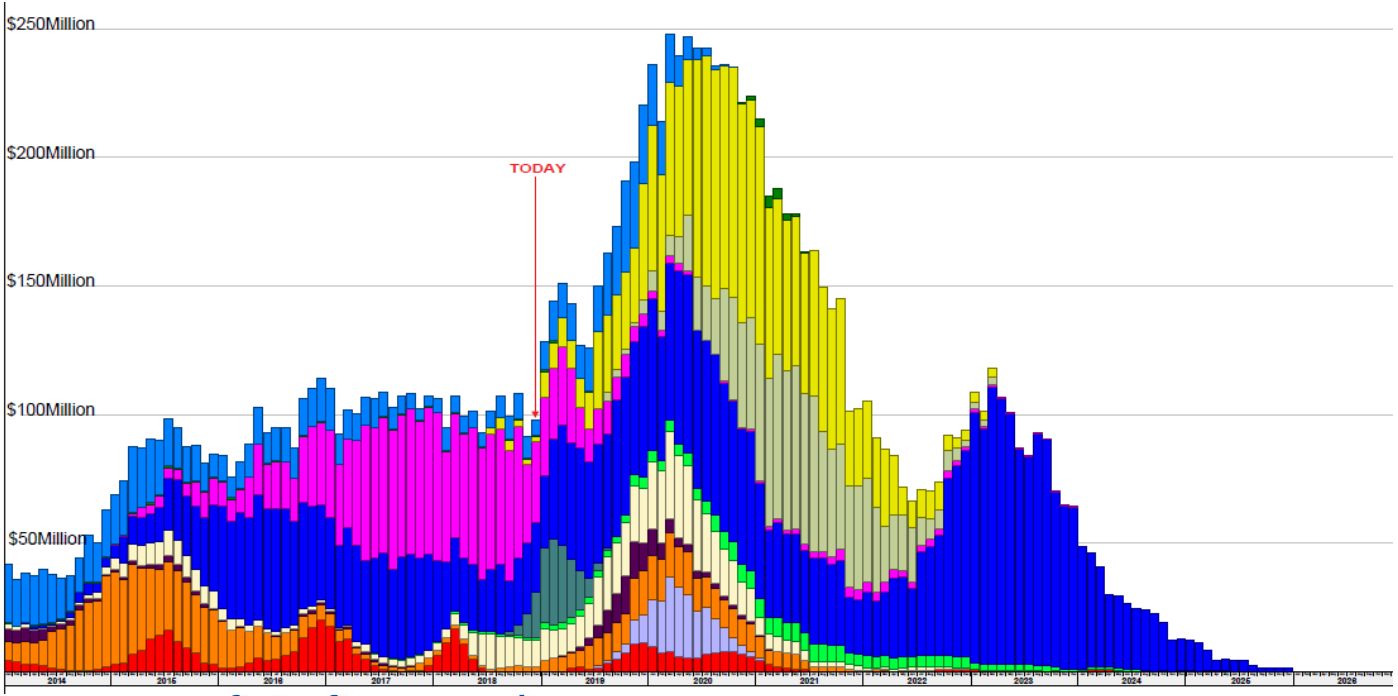
LAX – Los Angeles World Airports *LAWA*

$15B Capital Improvement Program currently underway

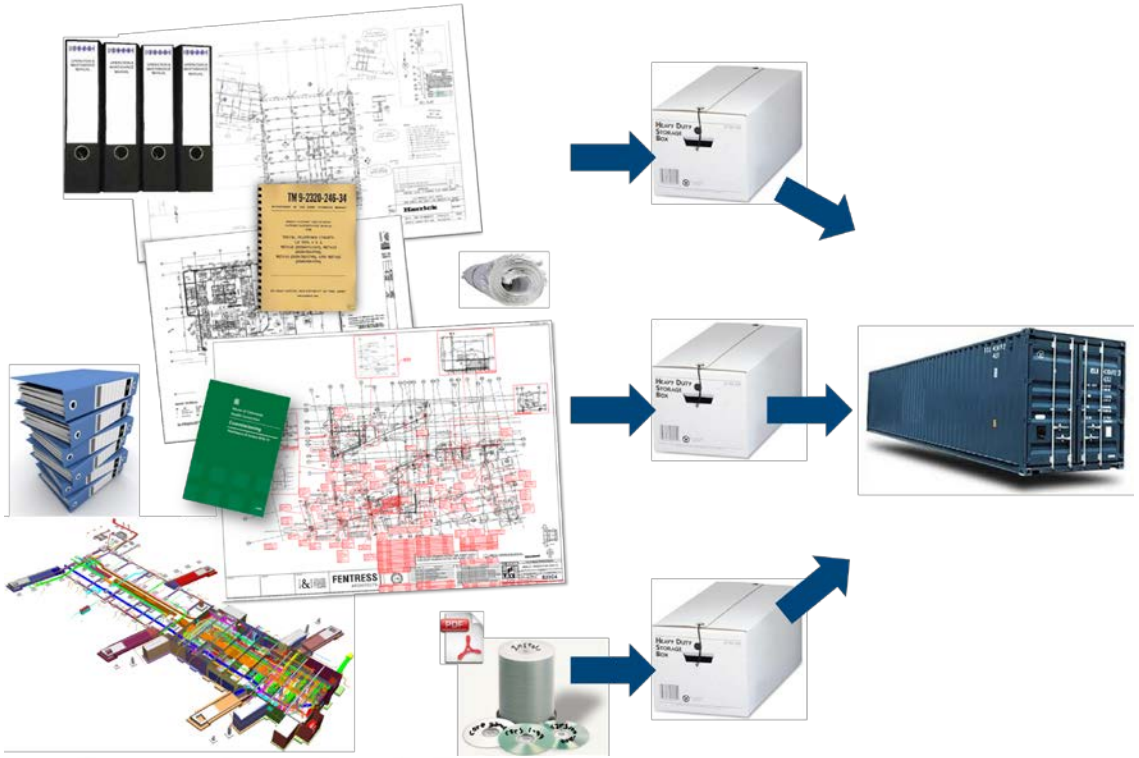
Los Angeles World Airports



A tidal wave of Information to consume

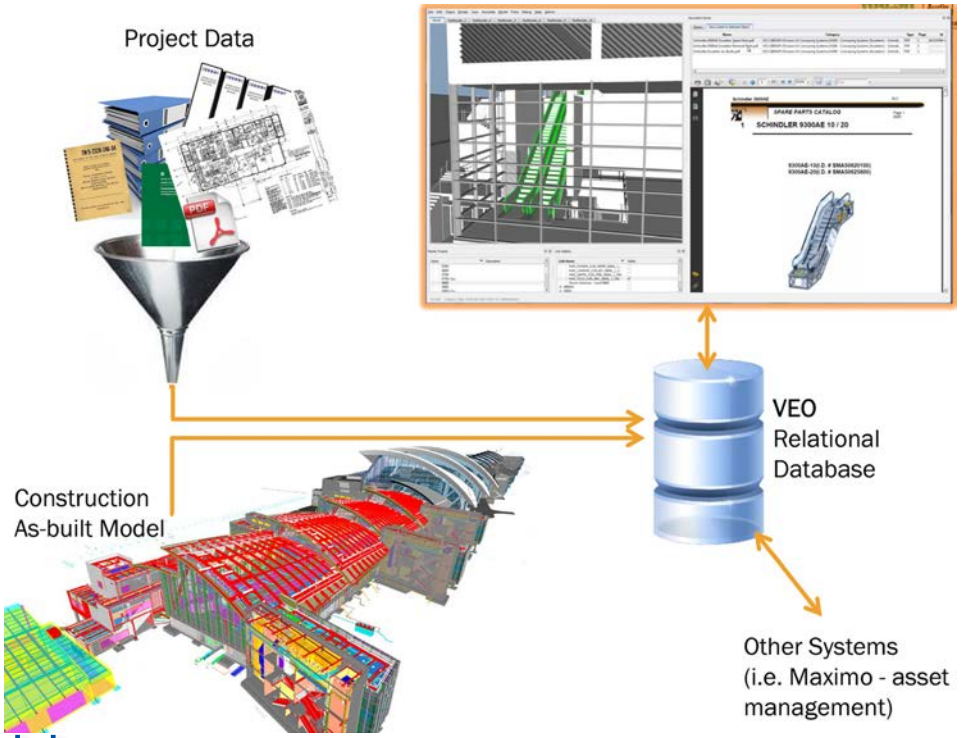
Leveraging the delivery process

Los Angeles World Airports



Current Industry Standard of Practice

"I know I got it, but just can't find it …"



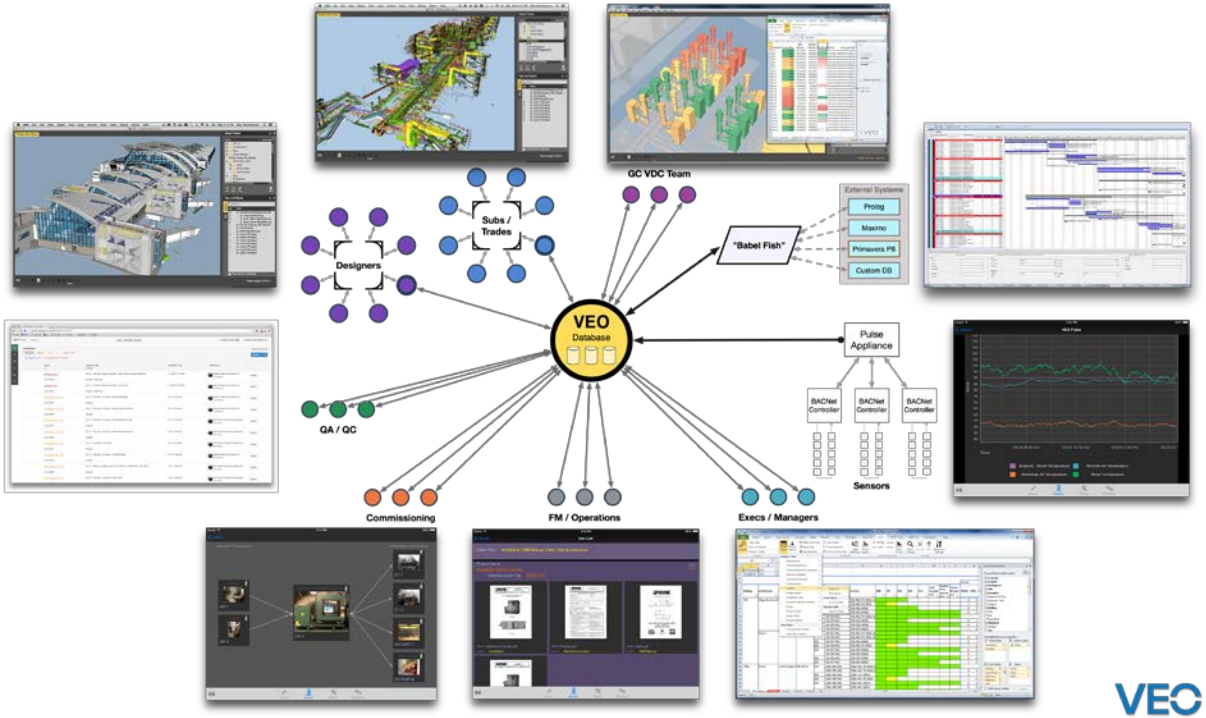
The Way it Should be

"I know I got it, and **can** find it when I need it …"

More than a Technology Choice

Now that I have it, what do I do with it?

Los Angeles World Airports



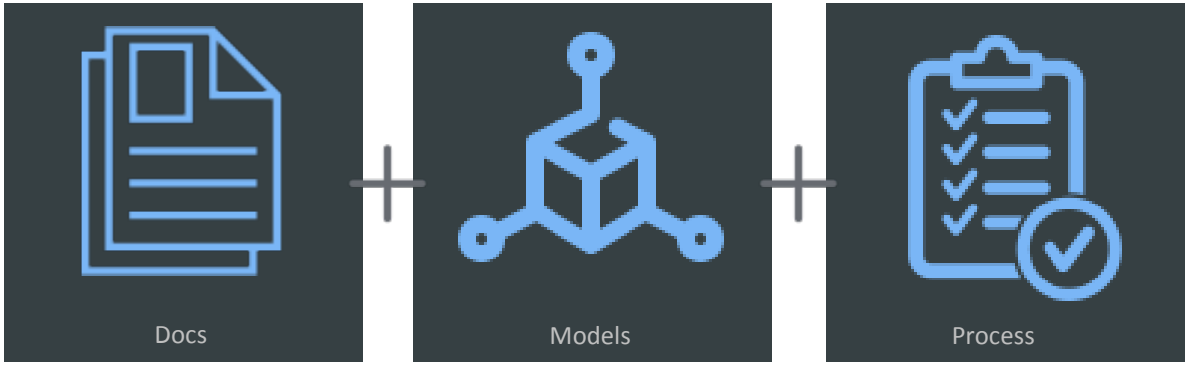
VEO

cBIM *centralized* Building Information Management

... making information *Available* and *Useful*

Los Angeles World Airports

… the What and Where of everything



VEC INEIGHT

All three parts active during project delivery

Leverage for information verification

Los Angeles World Airports

Punch List Issues

Historical Issue Tracker

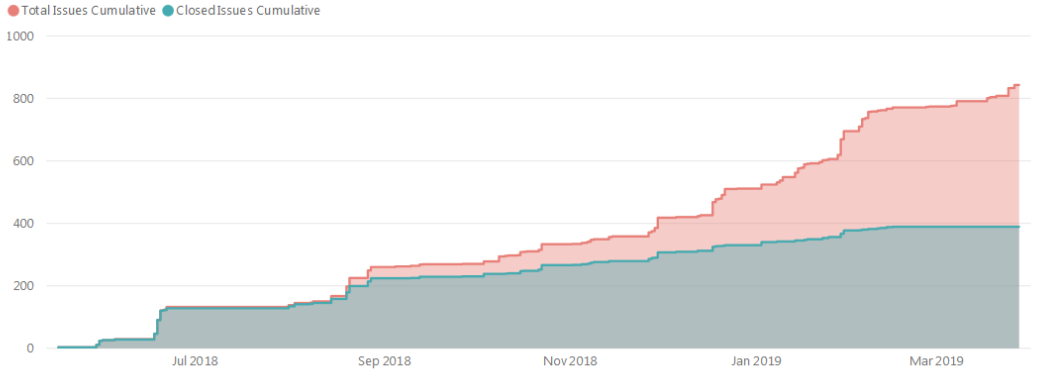
Issues reported and tracked in VEO.

This page does not include issues with a status of "Cancelled".

MENU | SUB STATUS SUMMARY | HISTORICAL ISSUE TRACKER | HOT STATISTICS | FLOOR PLANS

Building: All | Status: All | Level: All | Subcontractor: All | Zone: All | Category: All

Issue Tracker - Total V. Closed



ID	Team	Created By	Created	Description	Building	Level	Zone	Last Mod...	Status	No. Days Open	Subcontractor
PL-00557	Owner	JMarkowski	11/30/2018	- Water was observed leaking out of she-bolt holes and through a crack in the interior face of the CIP wall at grid lines N16-N16.5/99 and 100-99/N16. - Water was observed leaking at construction joint between interior face of CIP Wall and the PAX lid at grid lines N18.4/99. Reference attached photos.	MSC	01	N3	1/24/2019	Valid	118	Saddleback Waterproofing
PL-00562	Owner	SKourkos	11/30/2018	1" RMC lighting conduits not threaded at box connection at 99 line. Remove conduits and wire and thread conduits prior to re-attachment.	MSC	01	N3	12/6/2018	Closed		
PL-00385	Design Builder	desetmeyer	10/9/2018	11 Conduits on columns Area B1 11 Conduit penetrations thru floor not installed, not complete, not fire stopped, not tagged with Do not remove Firestop tags at 6" both sides of penetration.	NBS	01	B1	10/15/2018	Valid	169	Helix Electric
PL-00567	Design Builder	desetmeyer	11/29/2018	2" x 6" panels not installed at columns 33.9 & F9. Circuit 8 E2-10E4 May be mounted to BHS equipment	TUE	01	E3	1/29/2019	Valid	58	Helix Electric
[illegible]	Owner	DRose	1/29/2019	2" comm. conduit run exceeds 180 degrees at 102 Line.	MSC	03	N4	1/30/2019	Valid	58	Helix Electric
PL-00683	Owner	DRose	12/22/2018	24"x30" pull box cover damaged and missing handle	MSC	03	N3	1/16/2019	Valid	96	Helix Electric
PL-00578	Owner	SKourkos	11/30/2018	3 2" RMC conduits incomplete at east wall line 99 & N18. Complete raceway	MSC	01	N4	12/17/2018	Valid	118	Helix Electric

Total Issues: 843

Unresolved Issues: 454

% Complete: 46%

Avg Days Open: 84.94

Unexpected leverage points ...

Owners need to own it.

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Integration Considerations with BIM

Scott Yates, Chief Operating Officer
EDI, An Arora Company

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Kansas City Aviation Department

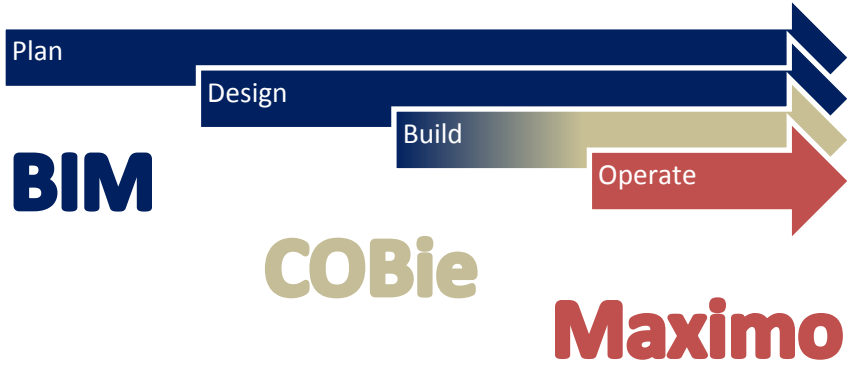
- The Kansas City Aviation Department owns and operates Kansas City International Airport and Charles B. Wheeler Downtown Airport.
- The MCI complex spans more than 10,000 acres, and its three runways can accommodate up to 139 aircraft operations per hour.
- Dedicated by Charles Lindbergh in 1927, Charles B. Wheeler Downtown Airport is the city's first airport. Located on 695 acres, the airport now attracts a large number of corporate, charter and recreational flyers.

New Single Terminal Building and Parking

- 39 gate Terminal replaces existing terminals A, B and C.
- The total estimated building area for the Terminal is 1,094,000 sf.
- A 6,300 space six-level garage
- The KCI Terminal will achieve LEED Gold certification.

New Project = OPPORTUNITY!

- **START FRESH:**
  - Facilities Design Management: BIM
  - Enterprise Asset Management: Maximo
  - Good Data: BIM to COBie to Maximo Hand-Off

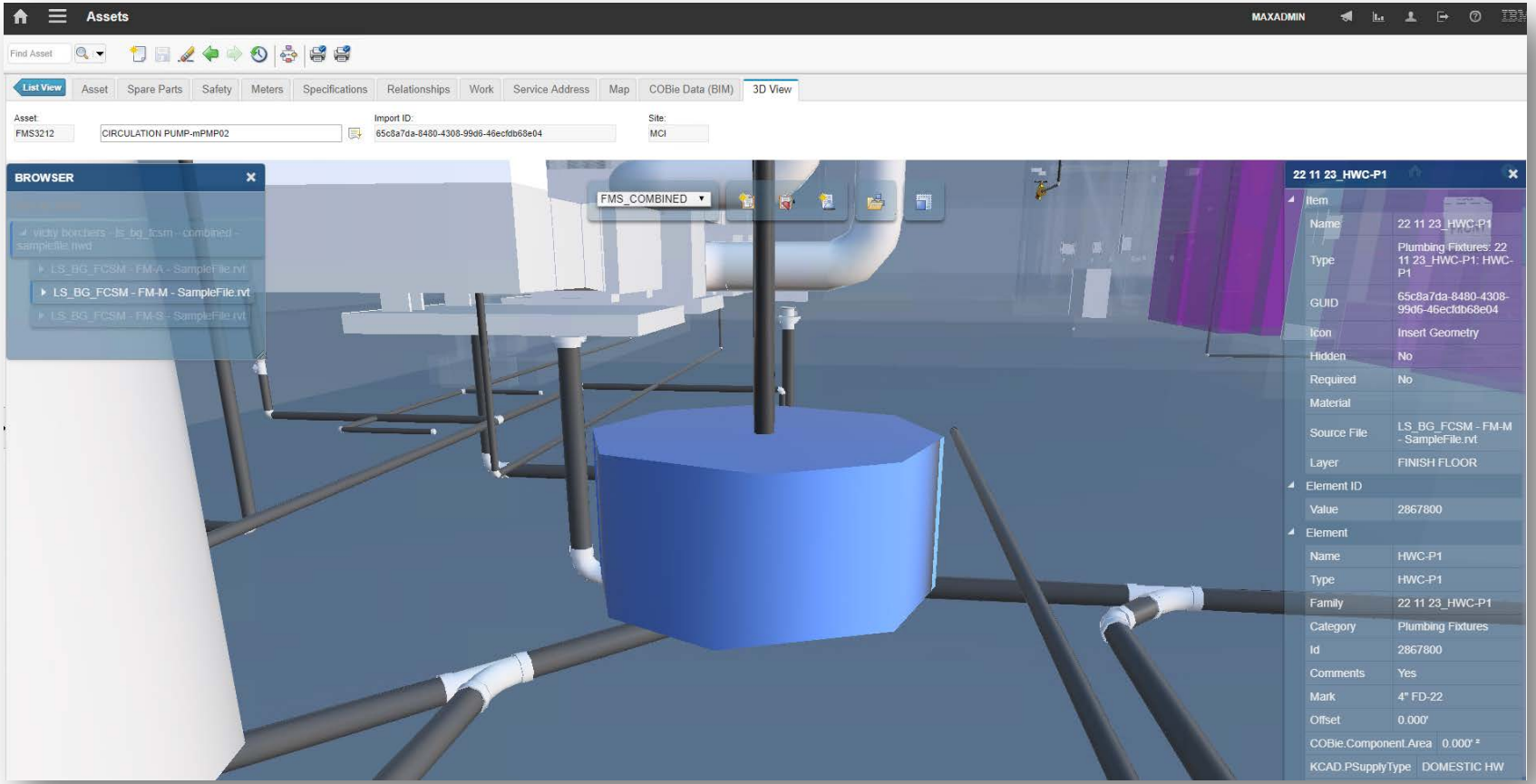


Pilot With New Maintenance Building

Plan
- Designed in Revit

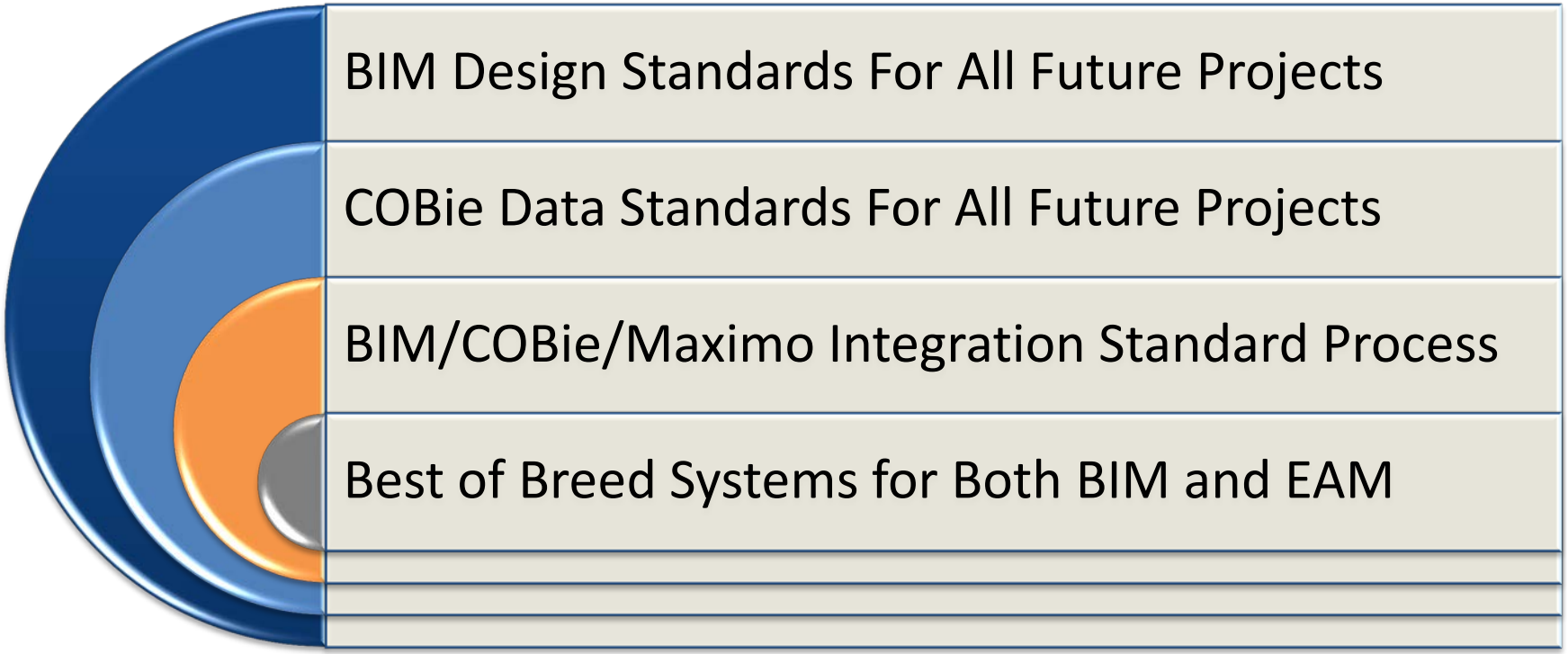
Build
- Data Enriched Through COBie Based Commissioning Tool

Operate
- Loaded Into Maximo and Linked to 3D Model



Maximo Asset Application: 3D Model View Tab w/ Asset Selected

Project Deliverables



BIM/EAM Integration “Opportunities”

Not an Actual Integration

- More of a data-load process
- One-way flow of data
- Maximo is a great EAM and information collector, but not a great 3D viewer
- Revit is a great design tool, but not a great execution or field data collection tool

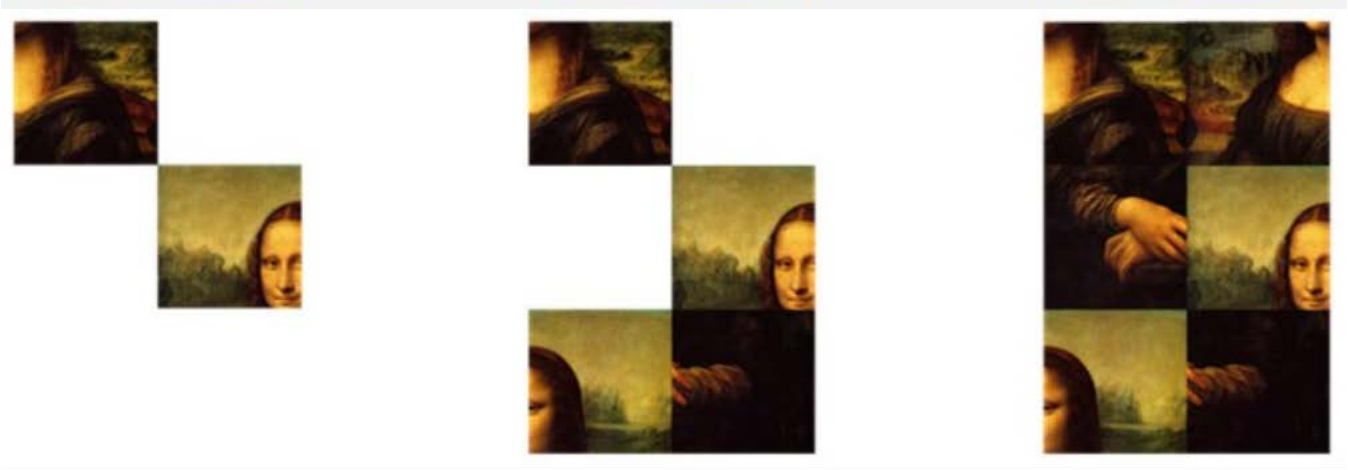
Level of Detail and Chain of Custody

Iterative

Level of Detail and Chain of Custody

Incremental

Level of Detail and Chain of Custody



Level of Detail and Chain of Custody

Success = Iterative and Incremental

Is the technology living up to the promise?

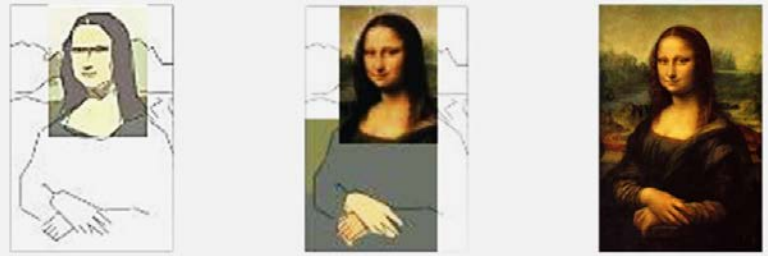
EAM of Future is Spatial-Based

Gap between Plan/Build and Operate can be Bridged by Integrating BIM and EAM

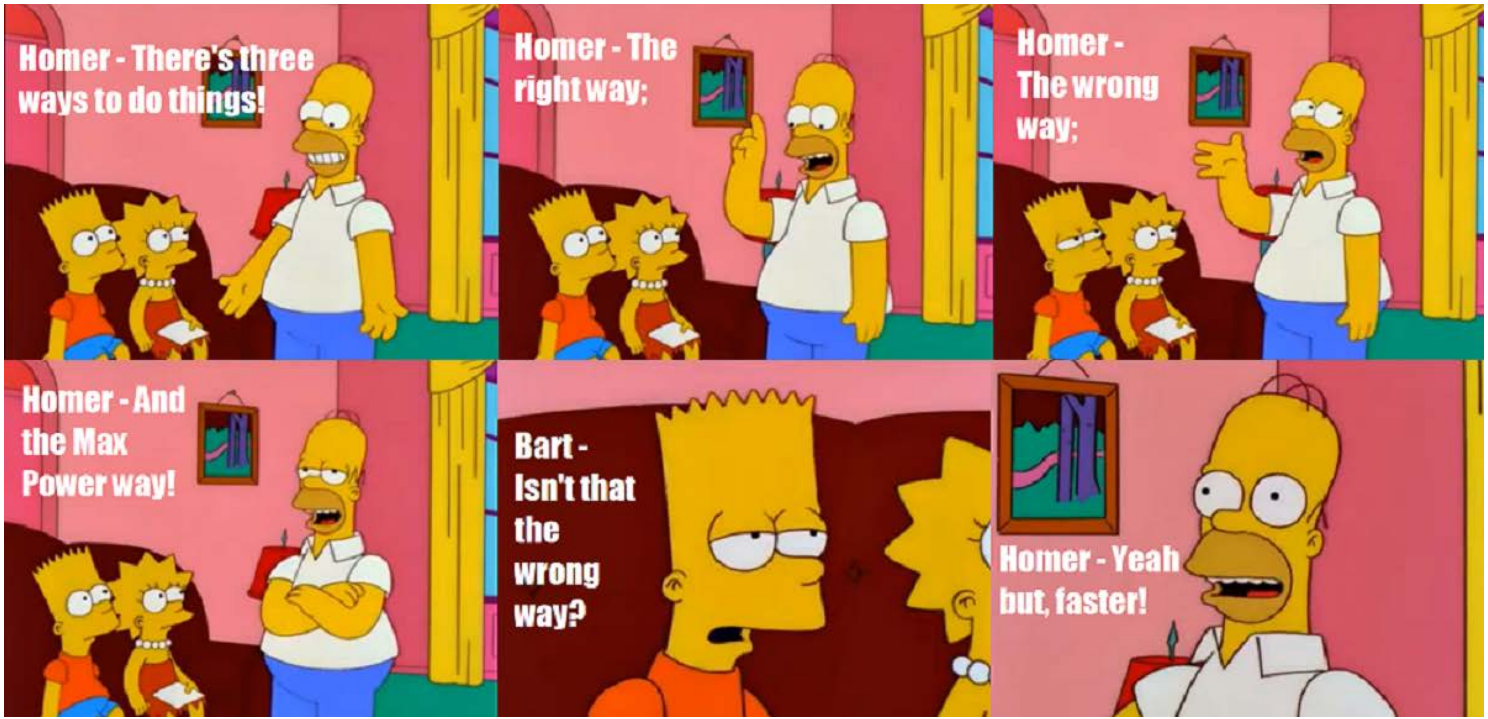
Plan
- Designed in Revit

Build
- Data Enriched Through COBie Based Commissioning Tool

Operate
- Loaded Into Maximo and Linked to 3D Model



Technology is NOT the Hurdle; It's People and Processes



Technology is NOT the Hurdle; It's People and Processes

The first rule of any technology used in a business is that automation applied to an efficient operation will magnify the efficiency.

The second is that automation applied to an inefficient operation will magnify the inefficiency.

-Bill Gates