# BIM-based facility management: Does it work for small projects? Part 1

David Stone

Director, Virtual Construction

HITT Contracting

AUTODESK. UNIVERSITY

# Agenda

1. Introduction
2. Learning objectives
3. Project approach
4. The case for 6D/FM
5. FM systems comparison
6. Stakeholders
7. Workflow samples
8. Challenges
9. Takeaways

# Informal Survey

## WHO IS IN THE ROOM?

Owners

Contractors

Designers

Vendors

Building Engineers/ Facility Managers

## FOR OWNERS – WHAT IS YOUR TYPE OF REAL ESTATE?

Office

Commercial

Institutional

Healthcare

Multifamily

## WHAT BENEFITS ARE YOU LOOKING FOR IN FM SOLUTIONS?

- Reduce downtime
- Reduce cost of management
- Monitor and troubleshoot assets
- Manage space
- Way finding for assets

## WHAT IS AN ACCEPTABLE PREMIUM FOR FM IMPLEMENTATION VS. CONSTRUCTION?

- 0%
- 1–2%
- 3–4%
- 5% or more

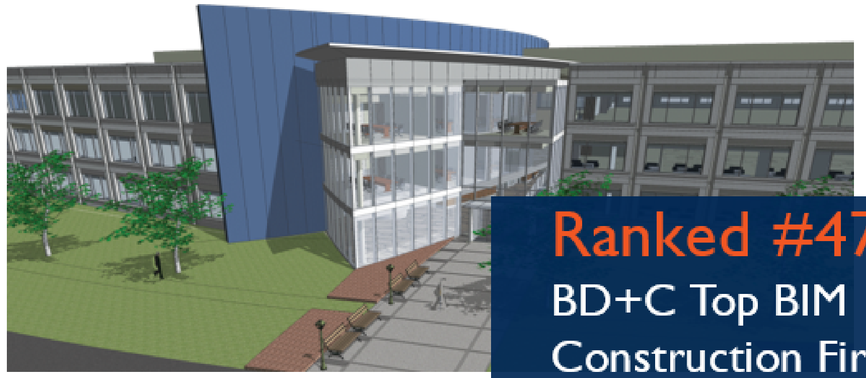
# About the speaker

## David Stone, LEED AP, AIA, DBIA

## Director, Virtual Construction HITT Contracting

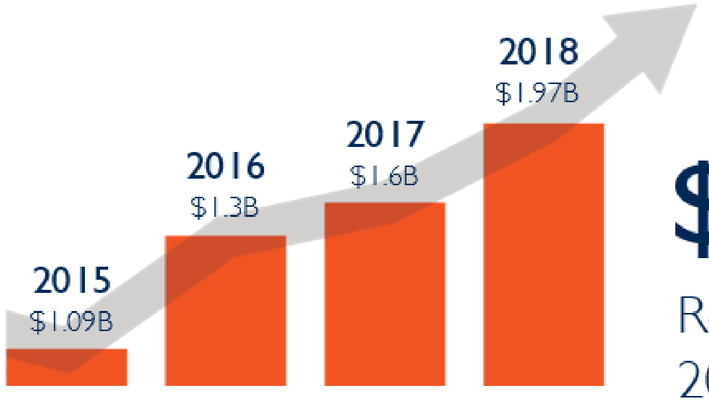
- 20 years of experience in architecture and construction.
- Responsible for developing the vision and strategy for the implementation of VDC processes
- Research and Development
- Collaborates with all Business Units to identify and address challenges unique to team objectives
- AIA, DBIA professional, LEED AP
- Twitter: @David_Stone_A

# About HITT Contracting



**Ranked #47**
BD+C Top BIM Construction Firms

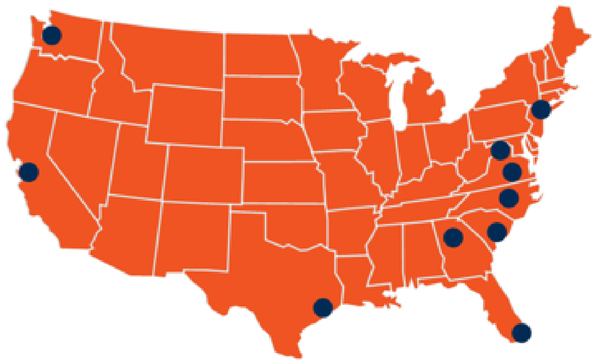
## FINANCIAL GROWTH




**$1.97B**
Revenue in 2018

HITT

## NATIONAL PRESENCE: HITT OFFICES



- Washington, DC
- Atlanta
- California
- Charleston
- New York
- Raleigh
- Richmond
- Seattle
- South Florida
- Texas

## HITT BY THE NUMBERS

**38** 2019 ENR Ranking

**175+** LEED Projects

**1055** Employees

# Project Baseline and Approach

## Timeline

1. Discuss design required BIM LOD 400 but no structured FM data
2. Utilize reality capture and BIM for 3D coordination
3. Propose facility management research project
4. Adopt existing BIM to FM solutions
5. Set up and implement selected FM systems for one year
6. Evaluate

# Learning Objectives

## LEARNING OBJECTIVE 1

Learn how to evaluate items to track for facility management.

## LEARNING OBJECTIVE 2

Narrow down the options for facility management solution types.

## LEARNING OBJECTIVE 3

Learn about the effort and cost of implementing an FM solution on a small project.

## LEARNING OBJECTIVE 4

Gain a checklist of metrics to determine value and ROI.

# Project Approach

## MAKING THE CASE FOR 6D

- If maintain a building is 80% to 90% of the cost for life of facility.
  - How does efficiency of maint. Effect savings?
- Unique opportunity as a builder to own and test new ways to operate building.

## EVALUATING SOLUTIONS

- How much functionality is enough?
- What type or Functionality?
- How easy is it to use?

## INITIATION OF SYSTEM

- Signing contracts & setting up a project
- Retrieving all necessary data
- Getting end user feedback

# Introduction to Co|Lab

Co|Lab is a space dedicated to bringing ideas to life and building change within our industry.

- Building construction type IV – Mass Timber
- Gross square feet – 8,600
- Net Zero, LEED Platinum, and LBC Petal certification
- Main spaces
  - Lobby
  - 4 multi-function work bays – 2 stories high
  - Large conference room
  - Multiple open space work locations
  - Rooftop balcony

# The Case for 6D/FM

# Phases / Stages

## STAGE A

R&D PROPOSAL

3 months prior to project completion, develop the R&D proposal to implement FM/6D post construction phase

## STAGE B

ONBOARDING

Collect all the relevant data and models, create a baseline and introduce solutions to stakeholders

## STAGE C

IMPLEMENTATION

Start using the solutions in the everyday operations of the building

## STAGE D

LESSONS LEARNED

Determine how feasibility of approach and next steps

# R&D Project Concept

- **R&D project idea:**
  - Our objective is to test three distinctly different facility management solutions that utilize:
    - BIM DIY approach – BIM 360 OPS
    - Integrator approach – Ecodomus
    - Vendor Approach - SYYCLOPS,Inc.

- **Hypothesis:**
  - We anticipate the scale of the Co|Lab project will allow relatively easy adoption of unstructured data.
  - Facility management team will choose to leverage the solution that is easiest to use.

- **Business purpose:**
  - Address client needs to maintain and reduce downtime in facility
  - Position HITT as a preferred GC
  - Inform strategic direction by exploring process, stakeholders required, and total effort entailed in offering this service
  - Establish ROI for facility management
    - Even a modest improvement  will result in offsetting the cost of this R&D project
    - This improvement percentage is expected to increase over the years of building occupancy as maintenance needs increase

# R&D Project Concept

- **Quantifying Success:** Engage with facility maintenance staff to use the selected platforms and give input on the comparative benefits of each system.
  - How intuitive or easy to use is it?
  - Track and compare the time taken to perform tasks
  - Determine how the process is performing preventative maintenance? Automated?
  - Outside of preventative maintenance, establish what maintenance issues came to light through the platforms: did anything surface that would otherwise have gone undiagnosed?
  - Discuss ease and accuracy of tracking assets compared to typical processes
  - Discuss ease of tracking work performed: how intuitive is the historical data?
  - Reflect on the platform's flexibility for various project types (building size, building type, etc.): how can we scale this information to our diverse sectors?
- Due to the multi-use nature of the Co|Lab, we anticipate applying lessons learned to many project types.
- Due to the lack of a baseline on the Co|Lab, we will rely on the experience of the senior staff and available industry standards for comparative data.

# Facility Management Systems Comparison

## BIM 360 OPS

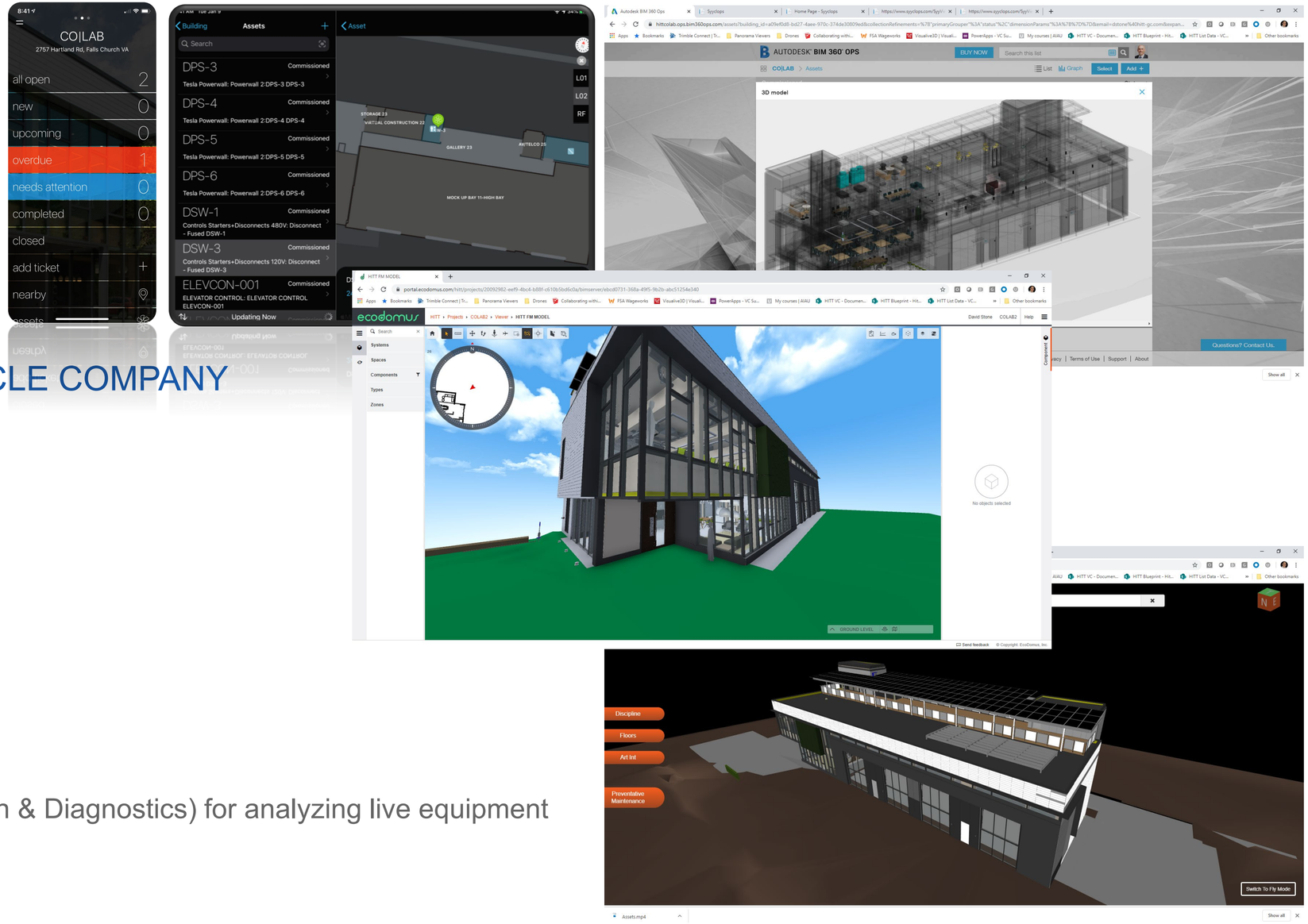
- Mobile device focus
- Ease of use
- Task oriented

## ECODOMUS – THE LIFECYCLE COMPANY

- Integration with BAS
- Robust 3D and
- Robust 2D navigation

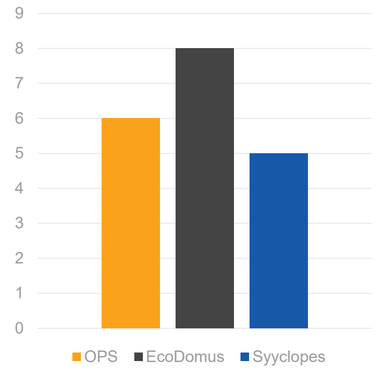
## SYYCLOPS INC.

- Total cost of ownership
- Purchasing and automated RFPs
- 3D navigation
- AFDD – (Automatic fault Detection & Diagnostics) for analyzing live equipment data for diagnosis
- Heat Map for problem areas



# Value-add Comparison

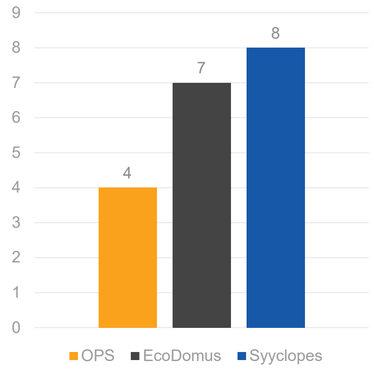
## Navigation 2D/3D




ECODOMUS

2D can be used to navigate to 3D location by level, making navigation more intuitive

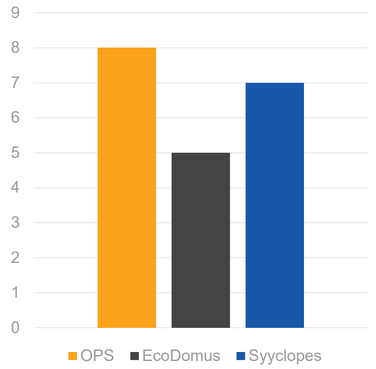
## Cost of Ownership




SYCLOPPS, INC.

Focus on tracking utilities and expected life of assets

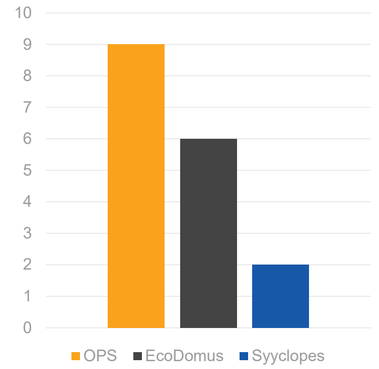
## Learning curve




BIM 360 OPS

End user is not required to understand any model navigation or focus on tasks

## Mobile Friendly




BIM 360 OPS

This solution has many is focused on mobile first approach

# Budgeting

## COST OF SOFTWARE

| FM Solution | License Cost | Hosting Cost | Implementation Integration |
|---|---|---|---|
| BIM 360 OPS | $125/Month | N/A | |
| EcoDomus | $125/Month | N/A | $5,000 |
| Syclopps Inc. | N/A | $300/Month | |

## TIME FOR SETUP

Project Manager – 100 hours (5 months) for R&D proposal, communication meetings, and OPS setup

Facility Manager – 40 hours (3 months) to input assets and PMs, communication meetings, and onboarding

Building Engineer – 40 hours (3 months) to input assets and PMs, communication meetings, and onboarding

## INITIATION OF SYSTEM

Once the proposed solutions have been reviewed in the HITT R&D request process, we reached out to the providers to understand what data will be needed to implement Facility Management at the CO|LAB.

# Stakeholders and Priorities

## OWNER (HITT)

Cost management

Space utilization

Efficiency

Transfer of Knowledge

## FACILITY MANAGER

Ease of use

Work tickets

Space planning

## BUILDING ENGINEER

Access to information – visual 3D and documentation

Actionable issues and resolution

Preventative maintenance workflow

# Data Collected / Needed

## CLOSEOUT DOCUMENT

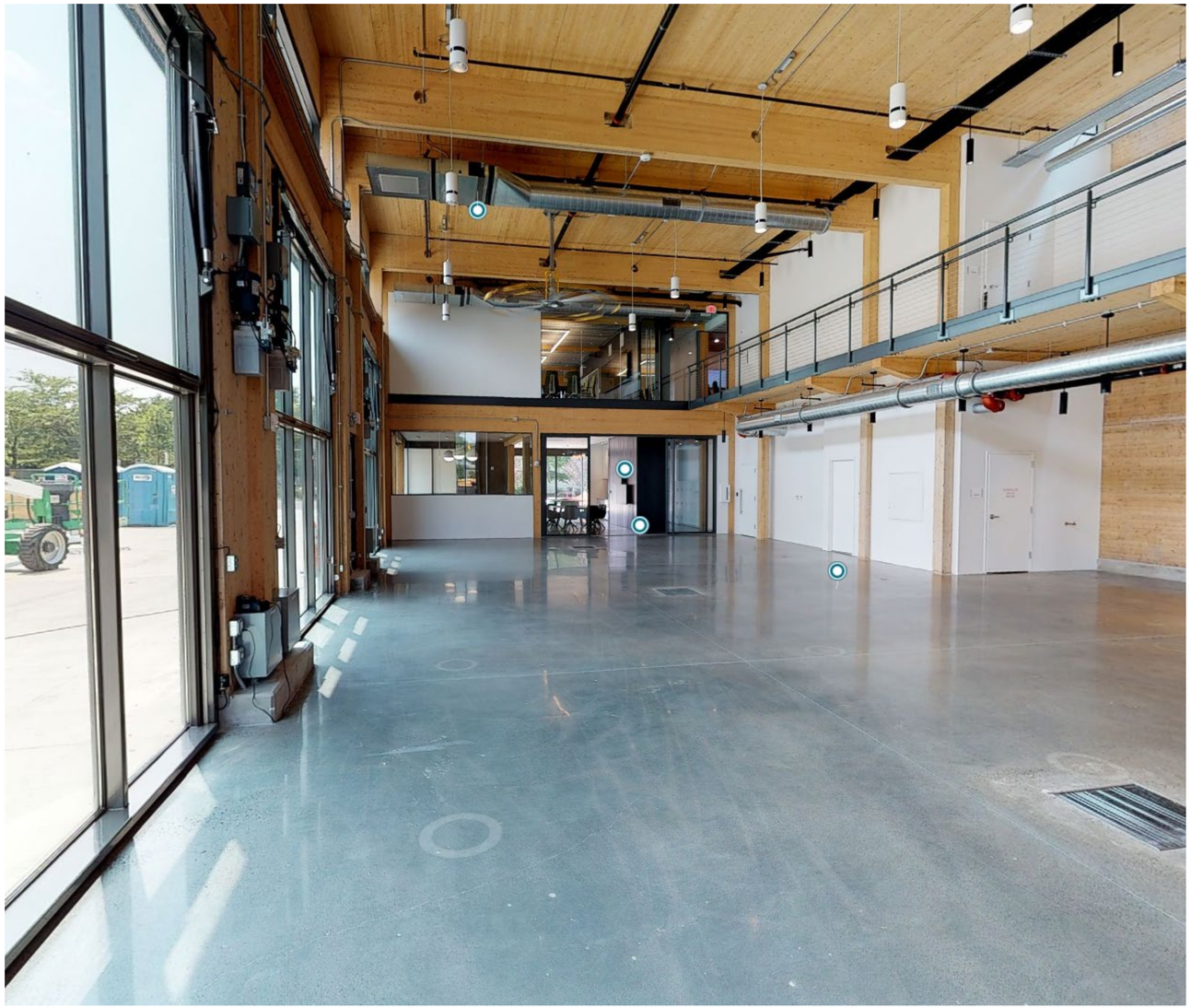
- PDF drawings and BIM
- Owner's manuals
- Submittals / specifications

## SETTING UP BIM FOR FM

- Cleaning up the model
- Updating for as-built including FFE
- Importing to FM solution

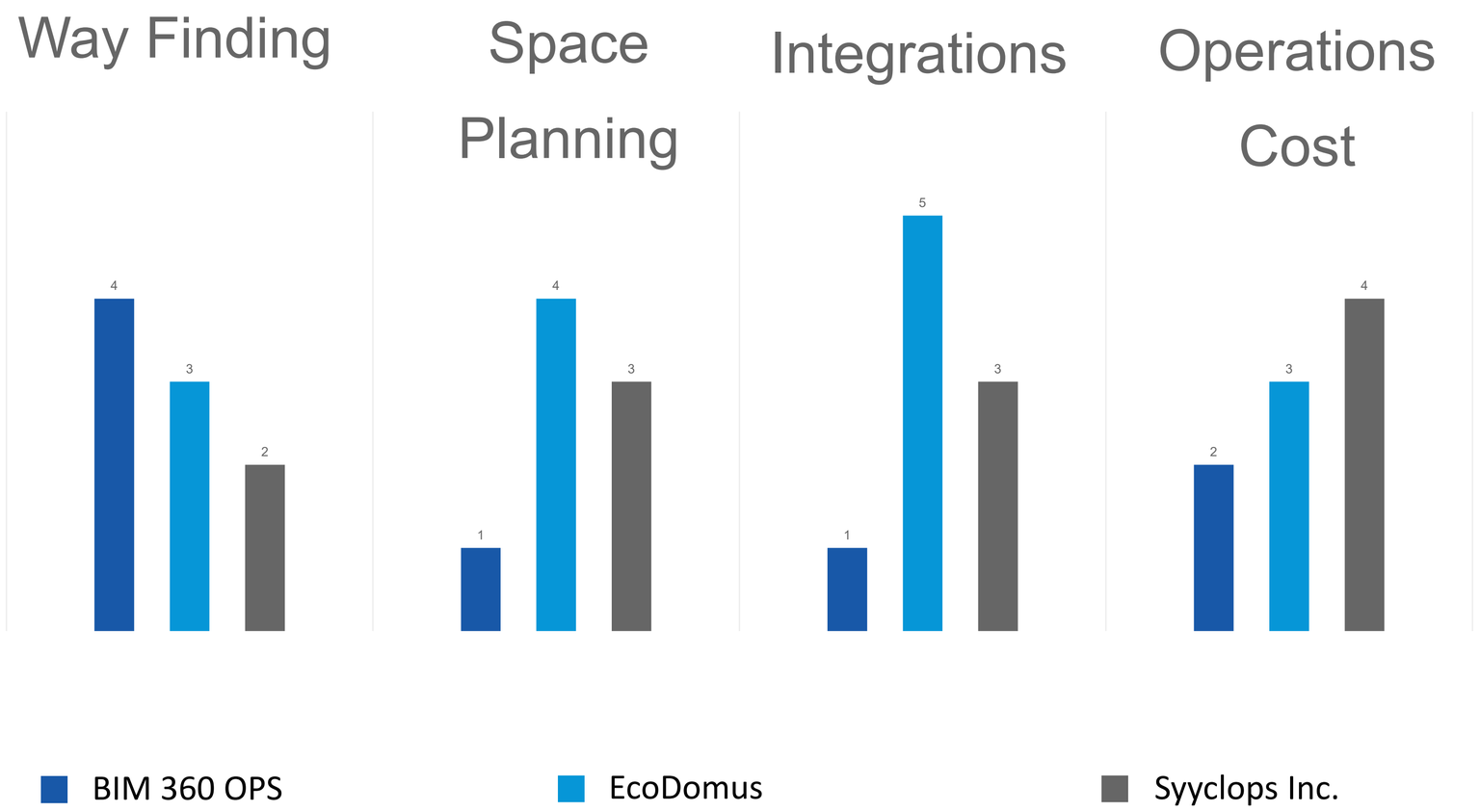
## PREVENTATIVE MAINTENANCE

- Preventative maintenance schedule
- Tickets
- Checklists



# Added Value for Each Solution

The following reflect the initial understanding of each software's capabilities beyond basic functionality.



# Costs of Implementing FM

| Design + Construction | Cost / SF | FM Cost | Ratio |
|---|---|---|---|
| $7,800,000 | $1,000 | $30,000 | LESS THAN 0.5% |
| Net area = 8,600SF | $300/SF | Includes: | 1.2% |
| | $200/sf | • FM Software | 1.7% |
| | $100/sf | • Manhours | 3.5% |
| | | Not including BAS | Based on sim. size |

# Items Targeted for Tracking in FM

## MEP/FP

- HVAC: quarterly
- Plumbing / Fixtures – Annually
- Sprinkler / Backflow – Quarterly + Annual
- Fire Alarm panel – Annual + Quarterly tests
- In-Floor Heat - Annual
- Big Ass  Fans – Semi-Annual

## FACILITY MANAGER

- Furniture
- Green wall: monthly + (spring / fall major)
- Events
- Landscaping
- Cleaning

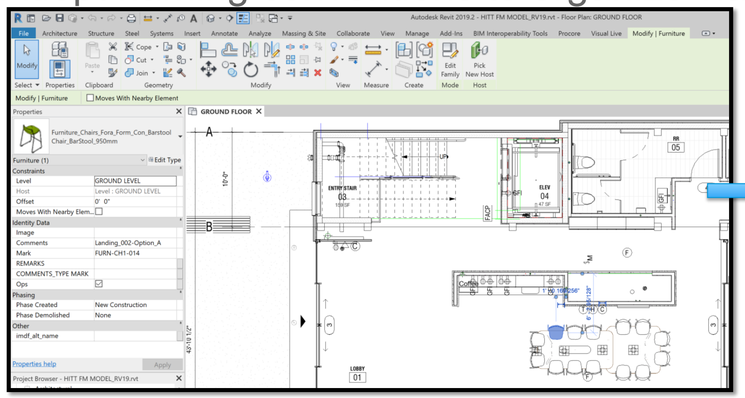
## OTHER

- Elevators: quarterly + semi-annually
- Roof: Annual inspection + monthly clean
- Cameras: annual
- A/V: Quarterly
- Bathrooms
- Appliances: DW, fridge, disposal, coffee maker
- Concrete floors: Daily, weekly, monthly
- Stainless steel: Bi-annually + annually
- Powder coating: Annually

# Revit to BIM 360 OPS – Workflow

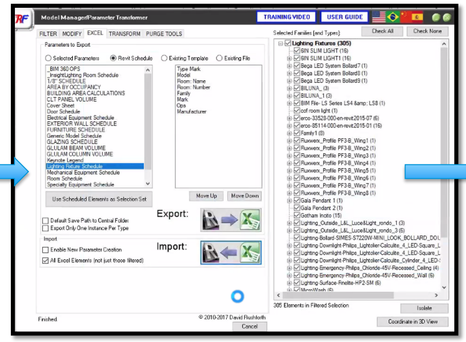
## MODEL CLEAN-UP

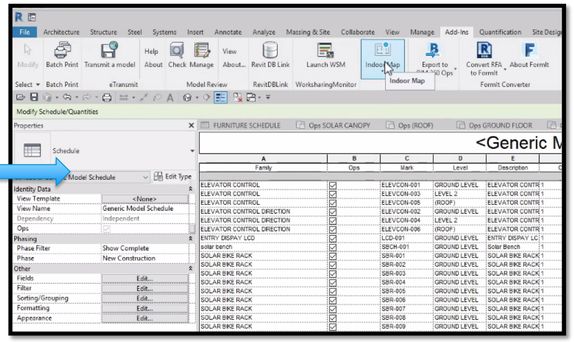
Adopt naming conventions to organize via schedules



## ASSET RENAMING

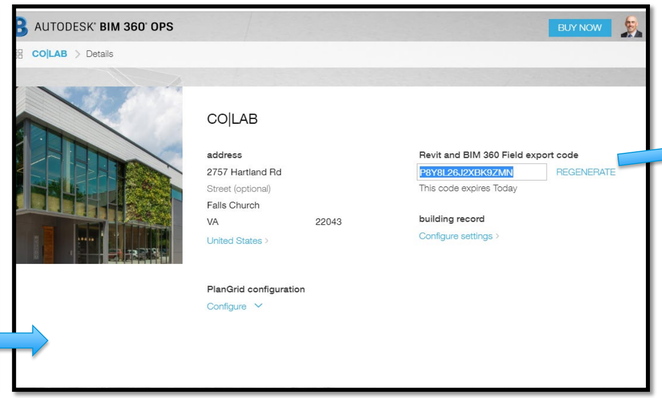
Bulk assignment of naming convention via excel



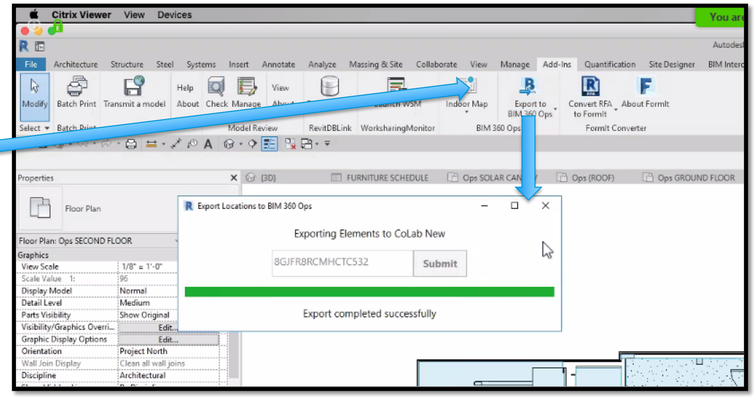
## START OPS PORTFOLIO AND BUILDING

Request an export link




## EXPORT FROM REVIT TO OPS

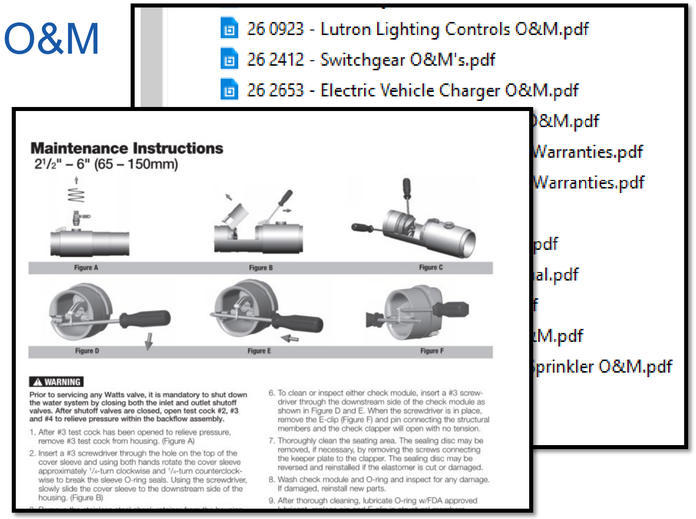
Export assets and data, or data only



# Creating a Checklist from O&M

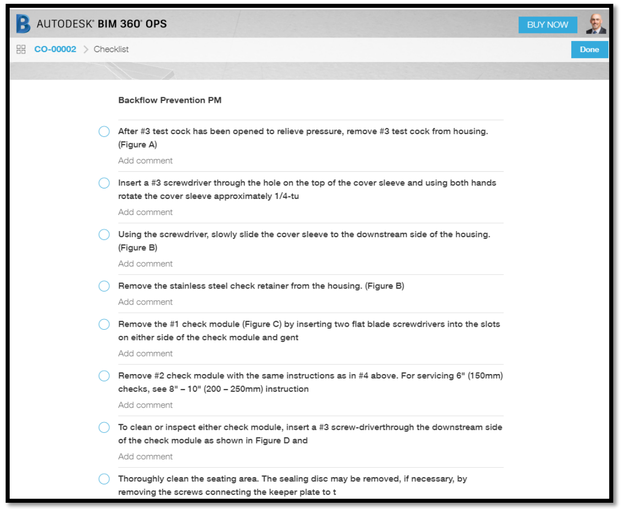
## LOCATE PM WITH O&M

- Folder structure
- Separate PM items



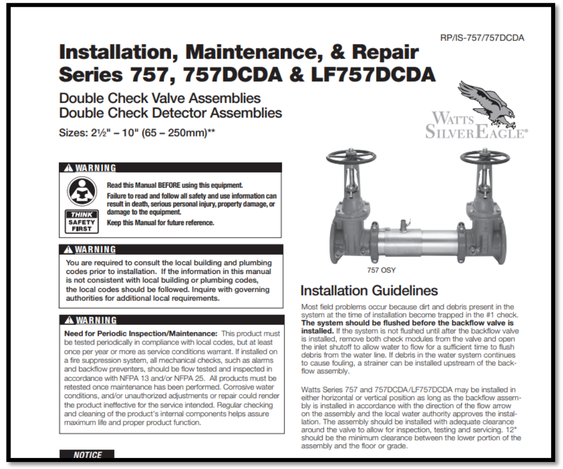

## CHECKLIST FROM PM

- Portfolio
- Checklist
- Create

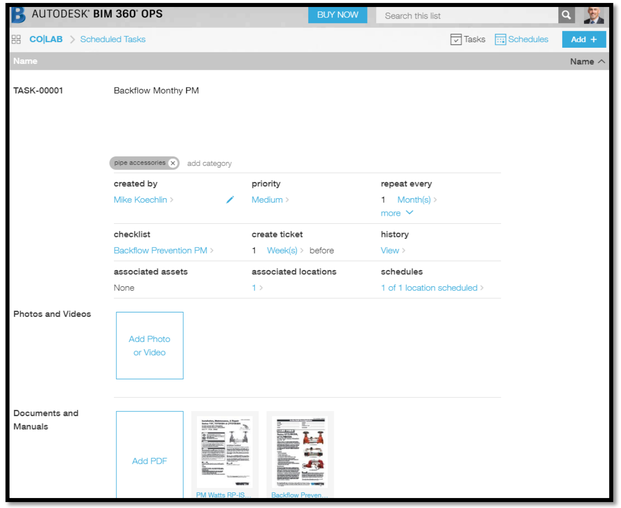


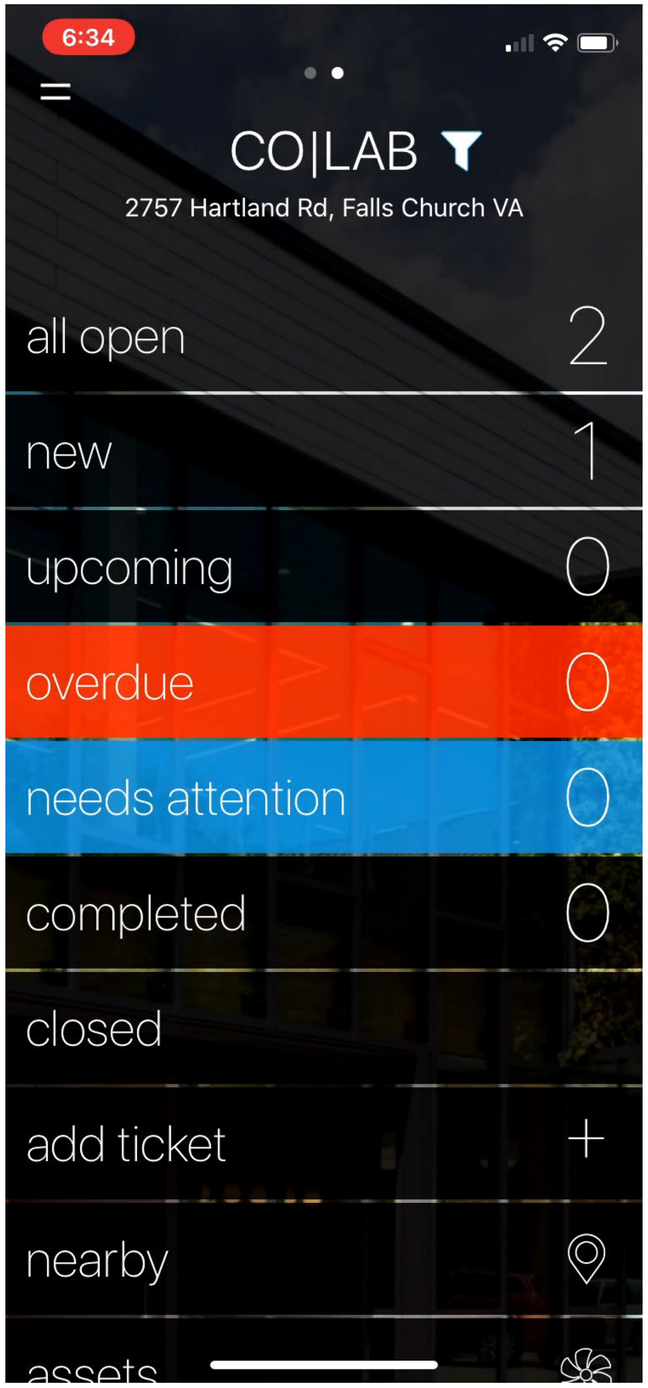

## UPLOAD O&M'S

- Specific to task




## CREATE A PM TASK

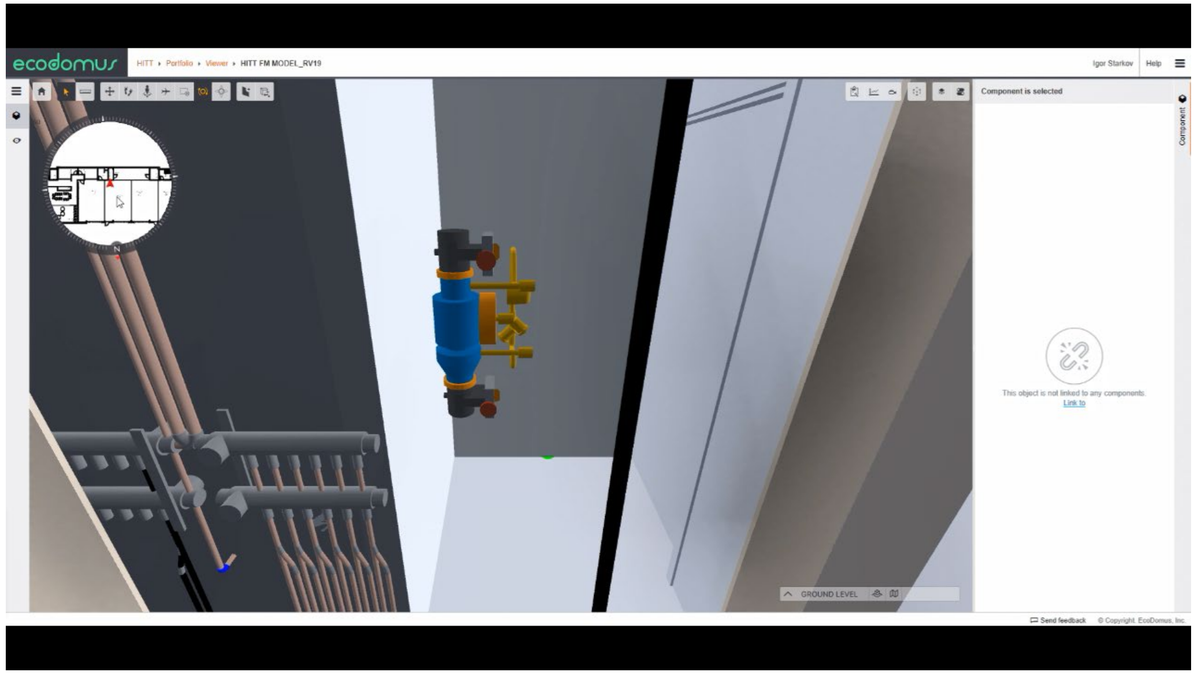





# BIM 360 OPS

## Workflow sample

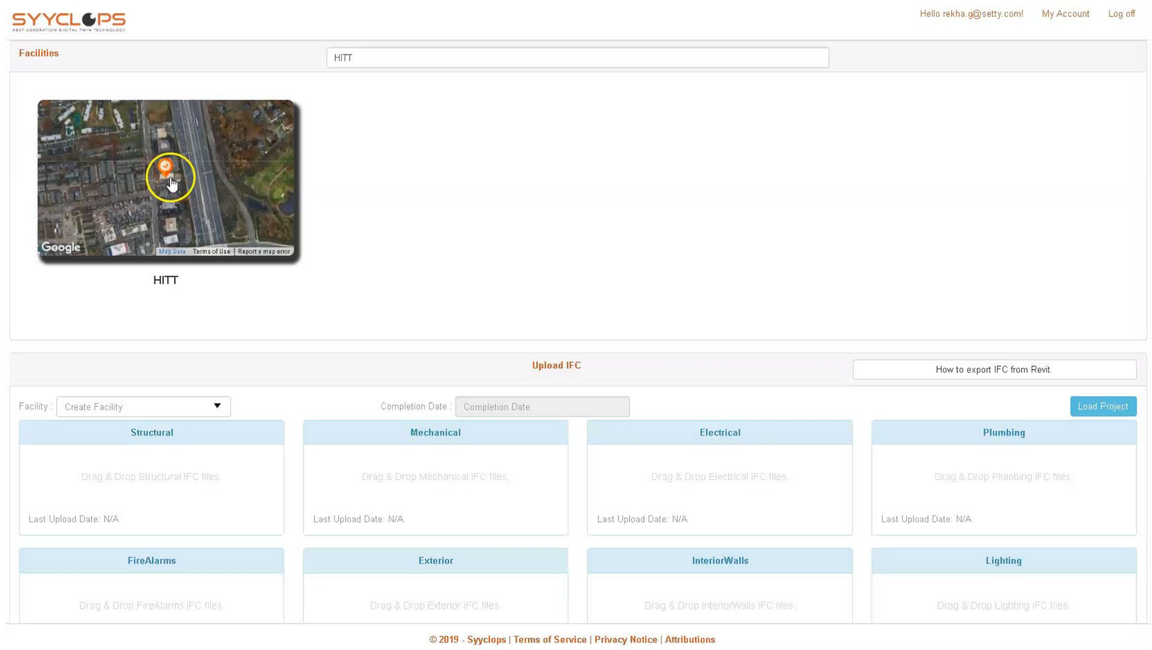
- Creating a task
- Assigning a task
- Completing a task
- Closing a task




# EcoDomus

## Workflow sample

- Creating a task
- Assigning a task
- Completing a task
- Closing a task




# Syyclops Inc.

## Workflow sample

- Creating a task
- Assigning a task
- Completing a task
- Closing a task

# Takeaways

# Takeaways… so far

## DATA COLLECTION

- Owner's manuals – 2 month delay
- Format of O&Ms – breakdown to assets
- FFE was not included in closeout document
- BAS system – 5 month delay
- PM’s checklists should have been required

## BIM MODEL

- Updating to match as-built
- Model assets do not match O&M’s
- Missing FFE elements in the model
- Proper naming conventions and data fields (example: FURN-TBL1-001)

## STAKEHOLDER INPUT

- Building engineer and facility manager had no set template to create a baseline
- Facility manager never used a facility management system
- Building owner was not familiar with FM systems

## IMPLEMENTATION

- How do you effectively run 3 solutions simultaneously?
- What are the metrics we want to track?

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