

BLD322245 - Indoor Mapping for Facilities Operations

Peter Costanzo

Director, Facilities Management – IMAGINiT Technologies

Jim Stoneberger

Team Manager, BSD East – IMAGINiT Technologies



Agenda

Speakers

Technology & Process Overview

IMAGINiT Indoor Mapping Pilot

Learning Objectives

Questions

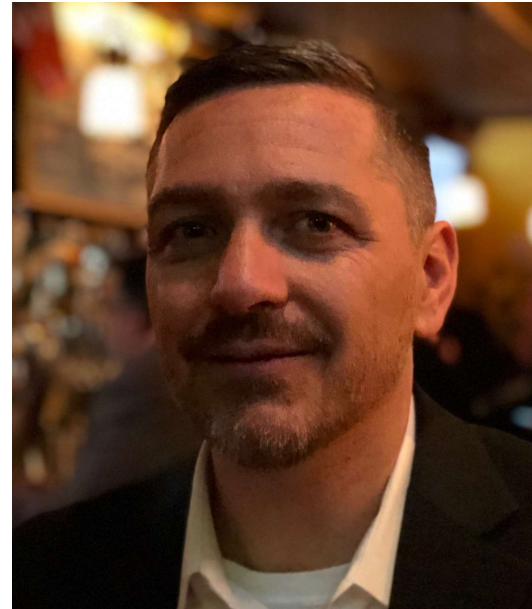
Speakers





Peter Costanzo, FMP

Director, Facilities Management
IMAGINiT Technologies



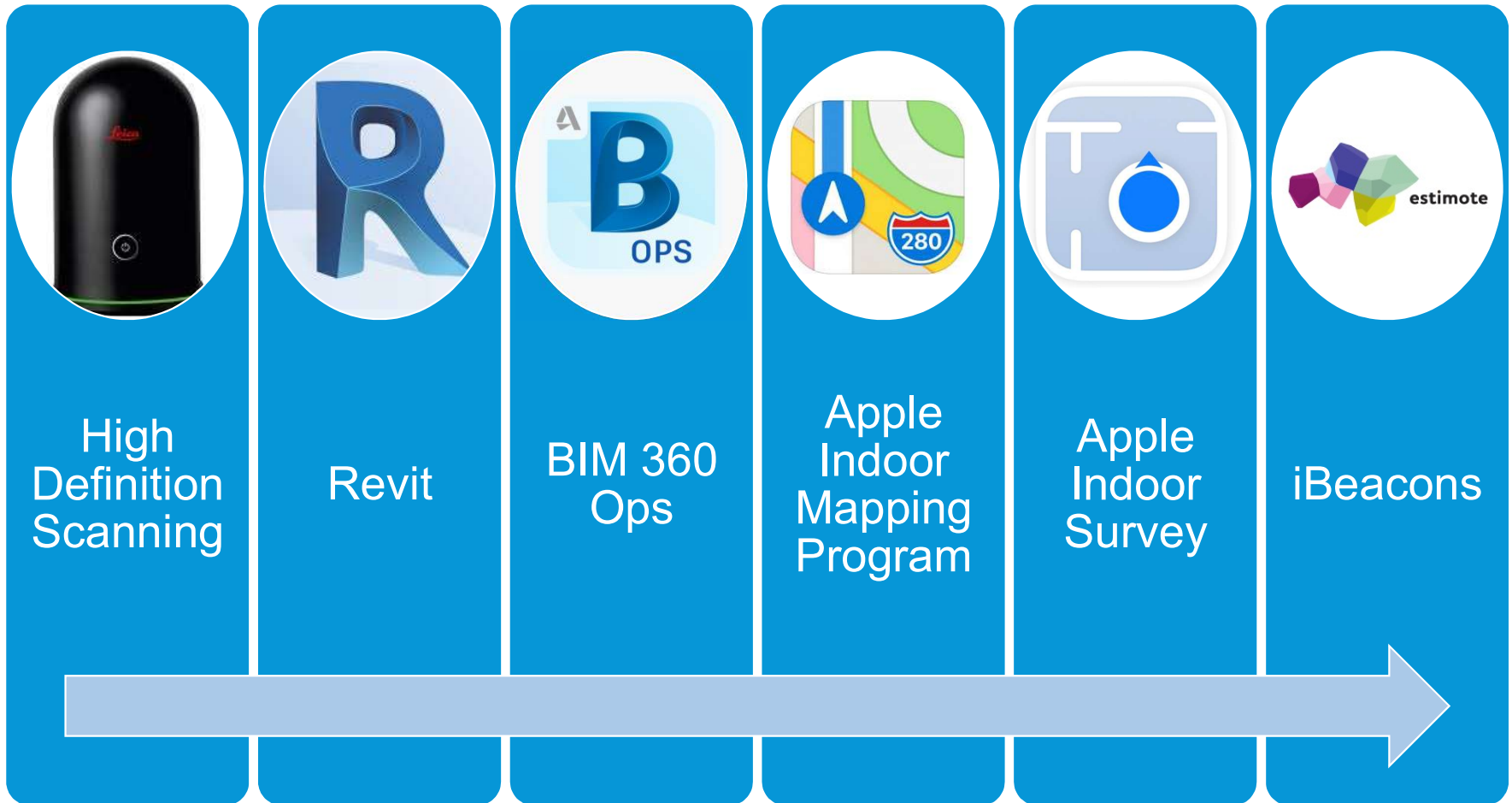
Jim Stoneberger

Technical Manager, BSD East
IMAGINiT Technologies

Technology and Process Overview

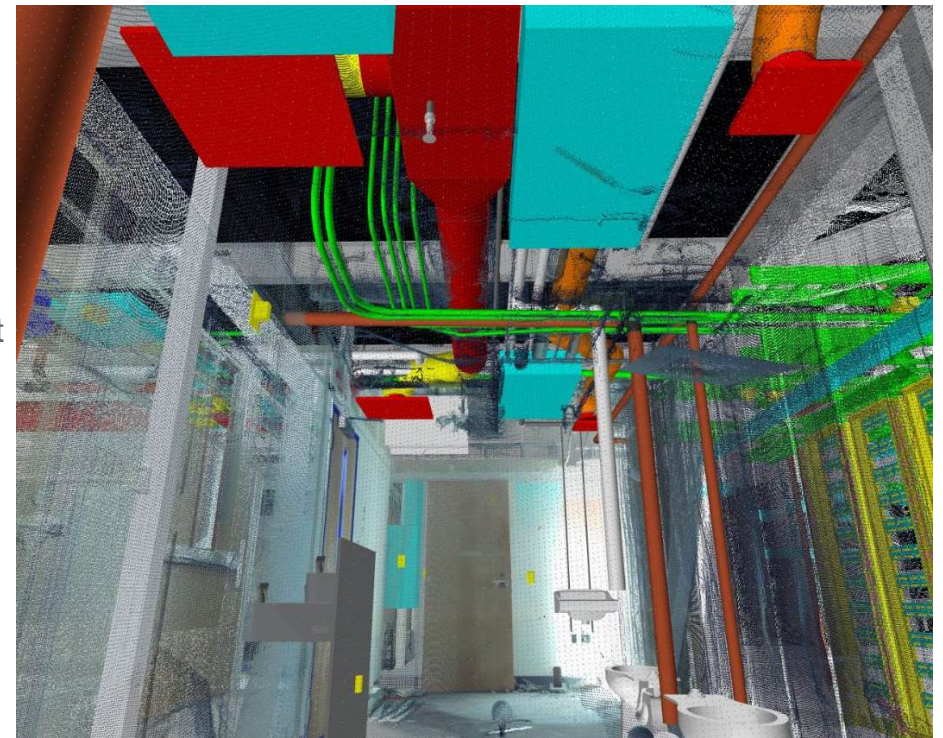


Technology and Process Overview



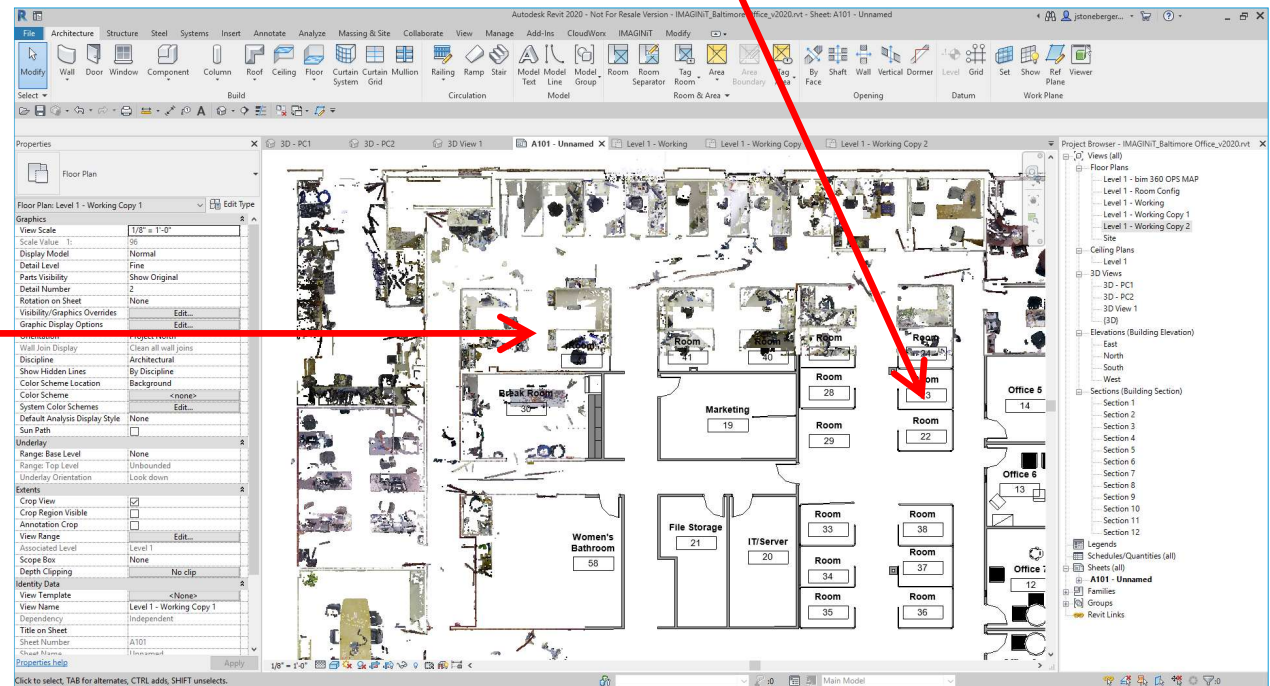
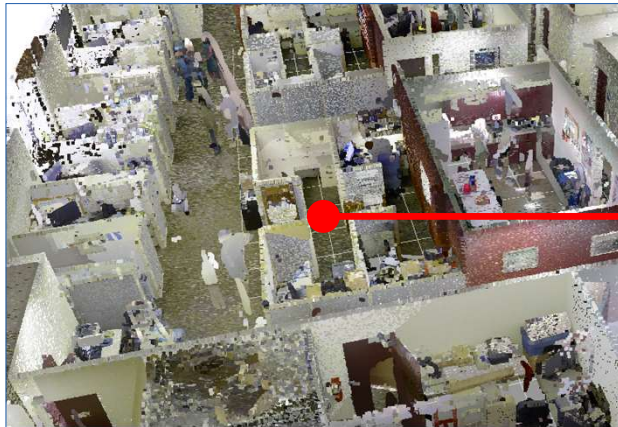
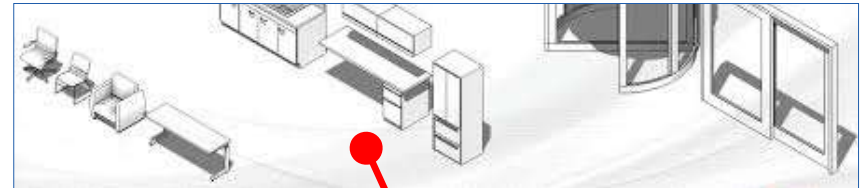
High Definition Scanning

- Indoor mapping requires accurate floorplans
- IMAGINiT scanned our office to:
 - Obtain good data to create Revit as-built
 - Compare scanner hardware, scanning method
- Scanning for facilities management and conversion to Revit
 - Hardware costs drastically reduced
 - Software tools improving rapidly
- HDS value add
 - 360 pictures (Picture & Scan)
 - Remote measurement space and assets
 - Emergency management
 - Virtual tours
 - **Augmented reality will play a part in the future of managing facilities**



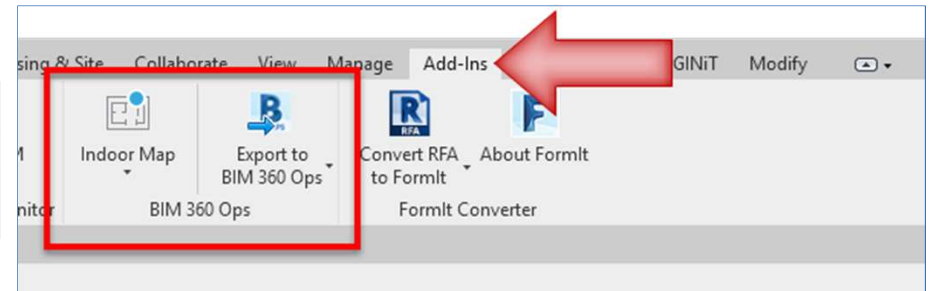
Point Cloud to Revit Conversion

- Convert Point Cloud scan data to Revit building model
- Leveraged IMAGINiT BIMswitch library

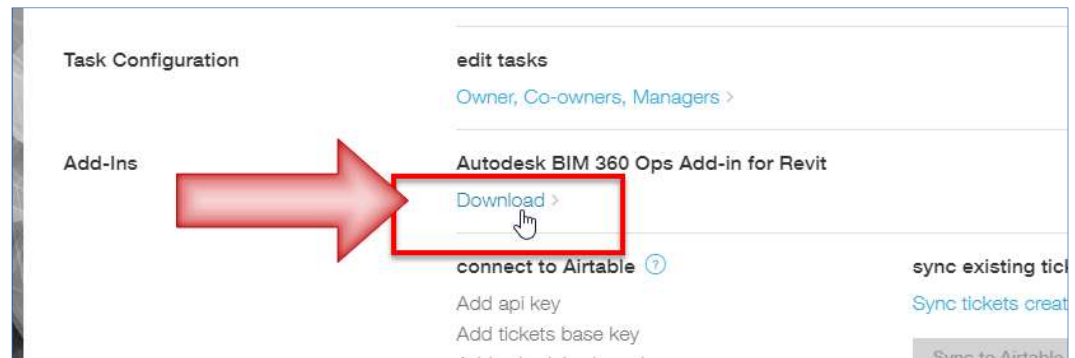
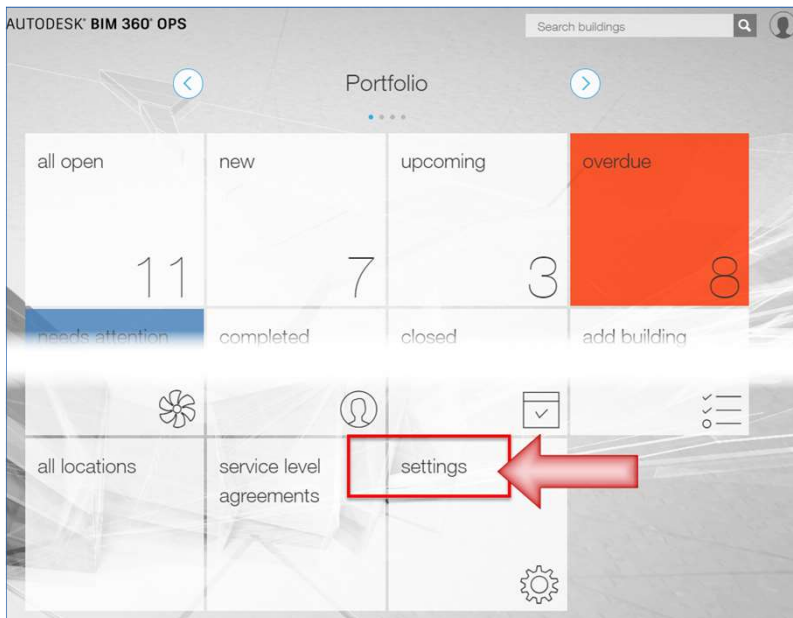


Revit BIM 360 OPS (and Indoor Map) Add-in

- BIM 360 Ops add-in
- Apple Indoor Map add-in

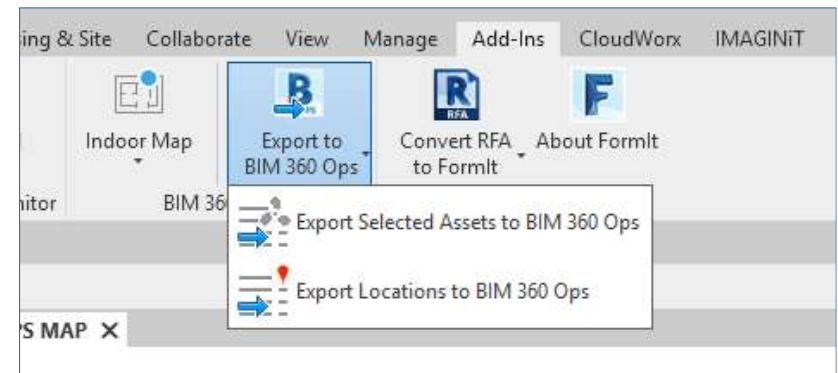
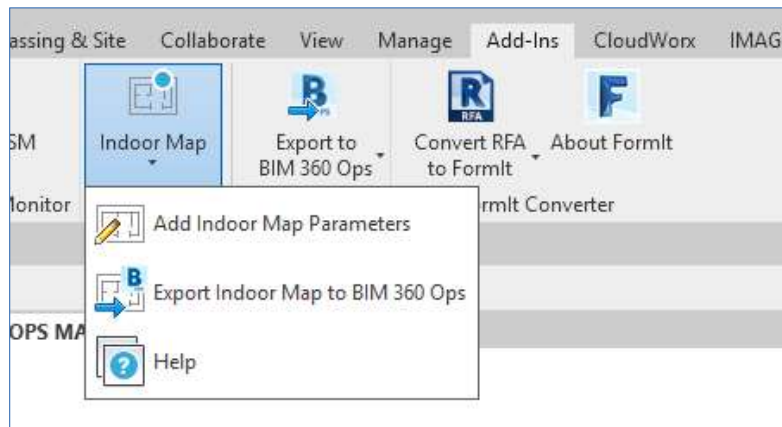
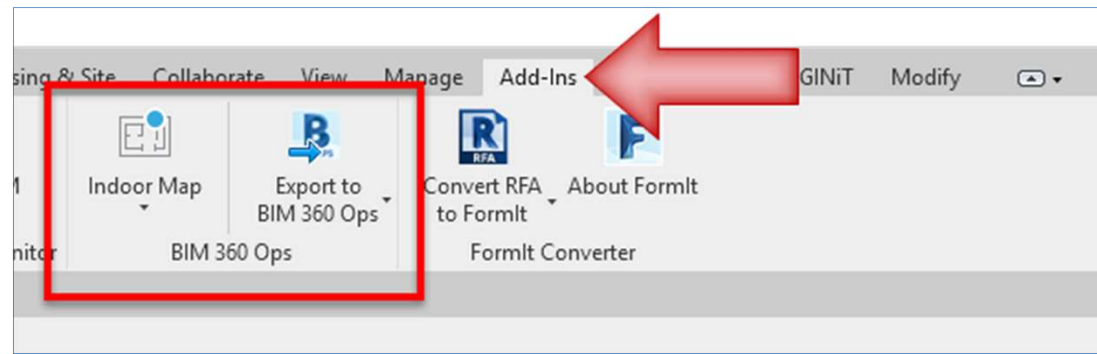


Downloaded from BIM 360 OPS SITE



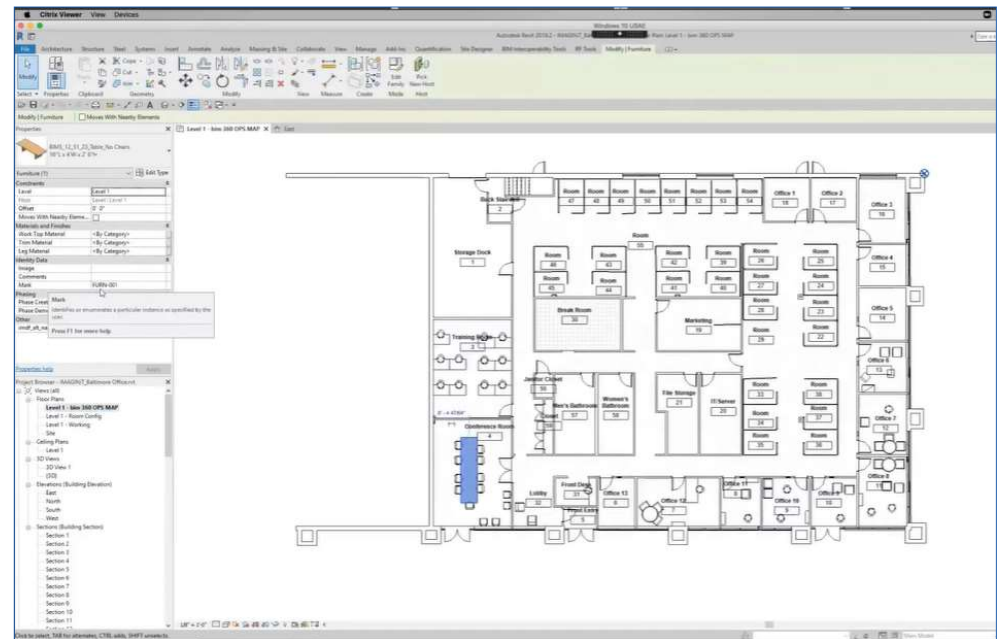
Revit BIM 360 OPS (and Indoor Map) Add-in

- BIM 360 Ops add-in
- Apple Indoor Map add-in



360 Ops Revit Integration & IMDF

- Open Revit Project
- Geolocate Project
- Create Ops floor plan views
- Verify room locations
- Verify assets associated to levels
- Indoor Maps Add-in
- Add indoor map parameters
- BIM360 Ops Add-in
 - Export room locations
 - Export Indoor Map to BIM 360 Ops
- Apple receives IMDF submission



BIM 360 & BIM 360 Ops

Design	Construction Documents	Pre-Construction	Construction	Commissioning and Handover	Operations
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 BIM 360 Docs

 BIM 360 Design

 BIM 360 Coordinate

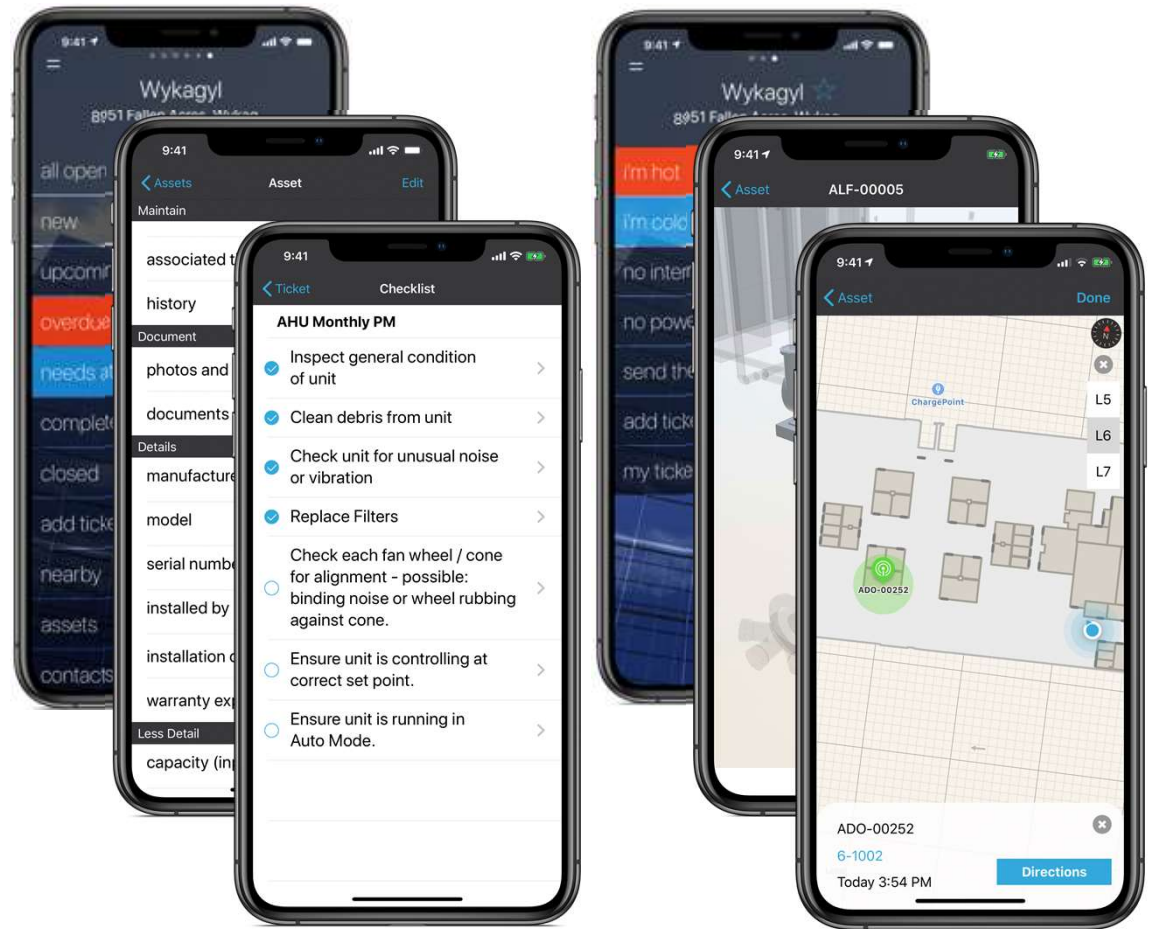
 BIM 360 Plan

 BIM 360 Build

 BIM 360 Ops

BIM 360 Ops

- Easy to use
- Mobile first maintenance management
- Connects to
 - BIM – 2D & 3D
 - Sensors
 - Apple Indoor Maps
- User friendly
 - Simple interface
 - Fat fingers
 - **IDIOT** “proof”...not Peter proof

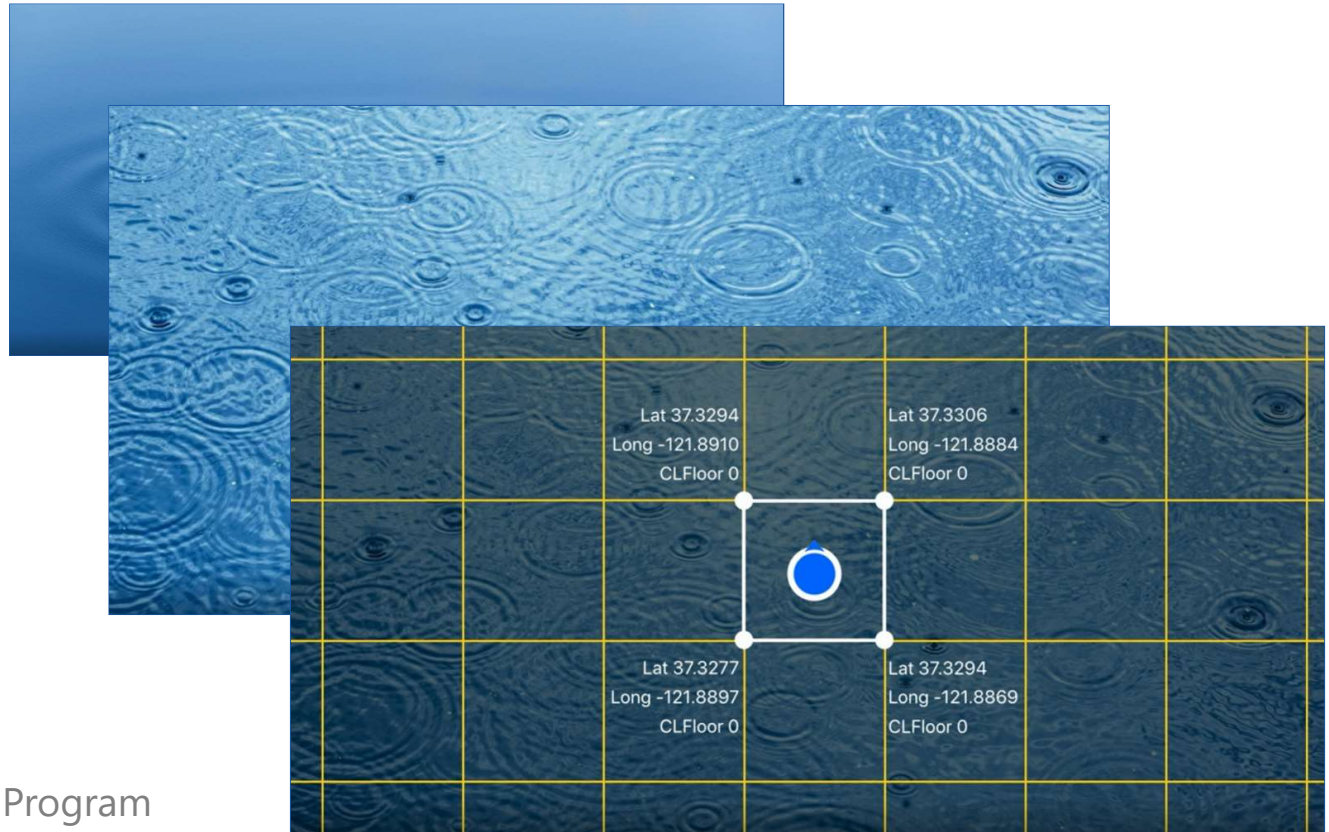


BIM 360 Ops Classes at AU 2019

Session ID	Title	Day and Time
BLD322234	Getting Started with BIM 360 Ops	Tuesday 1:30
BLD322245	Indoor Mapping for Facility Operations	Tuesday 2:45
BLD322176	Revit to BIM 360 Ops—Exporting Asset and Location Data for Facilities Management	Tuesday 4:30
BLD323807	Autodesk Facilities and BIM 360 Ops: How We Integrated Our Systems and Why	Wednesday 8:00
BLD322056	Maintaining Models with Value: What OSU Learned Moving to BIM	Wednesday 9:15
BLD334451	Leveraging Apple Indoor Maps Program for Building Operations	Wednesday 10:30
BLD322039	FM—with the End in Mind	Wednesday 1:30
BLD323156	How to Manage a Large Portfolio of Buildings in BIM 360 Ops	Wednesday 2:45
BLD322704	BIM 360 Ops for Data Centers: An Application Review	Wednesday 4:30
BLD323162	Existing to Expansion—BIM 360 Ops for the Fayetteville Public Library System	Thursday 8:00
CS323783	Getting Real with BIM 360: A Case Study of Autodesk's Boston Office	Thursday 10:30
CS322863	Enhanced Workflows to Successfully Implement BIM 360 Ops	Thursday 1:30
BLD322830	How to Write an Awesome Facilities Management Data Specification	Thursday 2:45

Apple Indoor Positioning 101

- Combines GPS & WiFi
- No hardware to install
- Simple process to add a facility
 - Join program
 - Convert Revit model to IMDF
 - Survey Venue



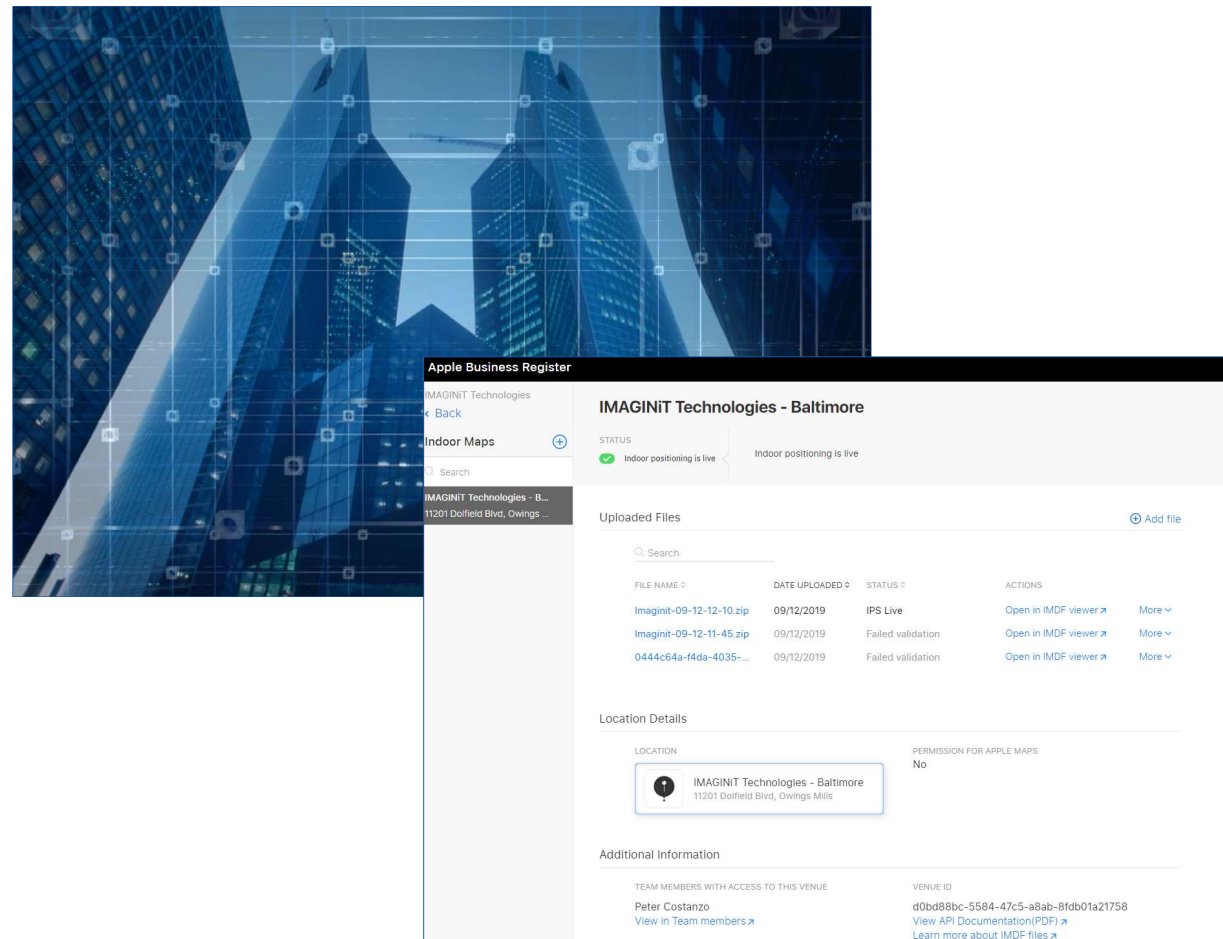
Introducing the Indoor Maps Program

Yuval Kossovsky

<https://developer.apple.com/videos/play/wwdc2019/245/>


Apple Indoor Mapping Program

- Join Indoor Maps Program
 - <https://register.apple.com/indoor>
 - Enroll organization
 - Organization must do this!
 - Manage possible members
 - Email when validation is complete
- Create IMDF
 - Indoor Mapping Data Format
 - Easy Button - Ops Revit Add-In



The right side of the image shows a screenshot of the Apple Business Register web interface for 'IMAGINIT Technologies - Baltimore'. The interface includes a sidebar with navigation links like 'Back', 'Indoor Maps', and a search bar. The main content area shows the status 'Indoor positioning is live' with a green checkmark. Below this is a table of 'Uploaded Files' with columns for File Name, Date Uploaded, Status, and Actions. The table lists three files: 'Imaginit-09-12-10.zip' (IPS Live), 'Imaginit-09-12-11-45.zip' (Failed validation), and '0444c64a-f4da-4035-...' (Failed validation). Below the table is the 'Location Details' section, which shows the location 'IMAGINIT Technologies - Baltimore' at '11201 Doffield Blvd, Owings Mills' and a 'PERMISSION FOR APPLE MAPS' status of 'No'. At the bottom, the 'Additional Information' section lists team members with access to the venue, including 'Peter Costanzo', and provides a venue ID and links to API documentation and IMDF files.

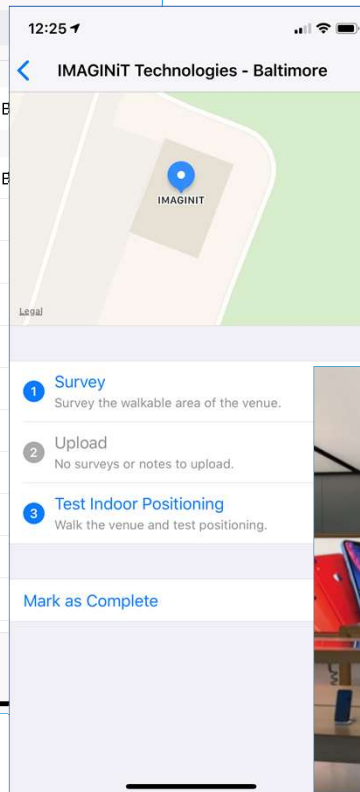
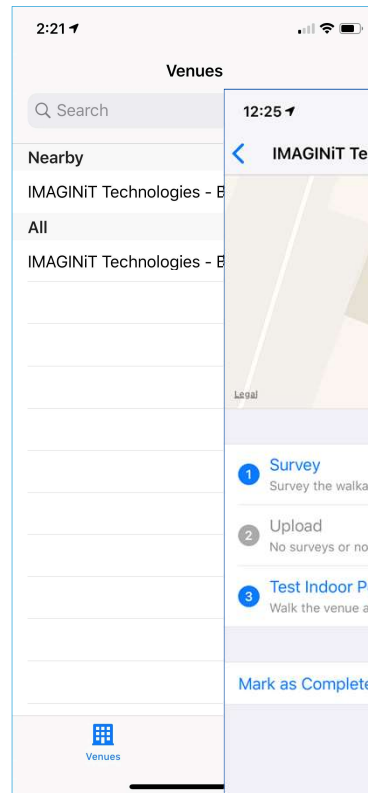
FILE NAME	DATE UPLOADED	STATUS	ACTIONS
Imaginit-09-12-10.zip	09/12/2019	IPS Live	Open in IMDF viewer More
Imaginit-09-12-11-45.zip	09/12/2019	Failed validation	Open in IMDF viewer More
0444c64a-f4da-4035-...	09/12/2019	Failed validation	Open in IMDF viewer More

LOCATION	PERMISSION FOR APPLE MAPS
 IMAGINIT Technologies - Baltimore 11201 Doffield Blvd, Owings Mills	No

TEAM MEMBERS WITH ACCESS TO THIS VENUE	VENUE ID
Peter Costanzo View in Team members	d0bd88bc-5584-47c5-a8ab-8fdb01a21758 View API Documentation(PDF) Learn more about IMDF files

Apple Indoor Survey

- Load Indoor Survey App
- Log in
- Select venue to be surveyed
- 3 Steps
 - Survey
 - Upload
 - Analysis
 - Activation
 - Test



Beacons 101

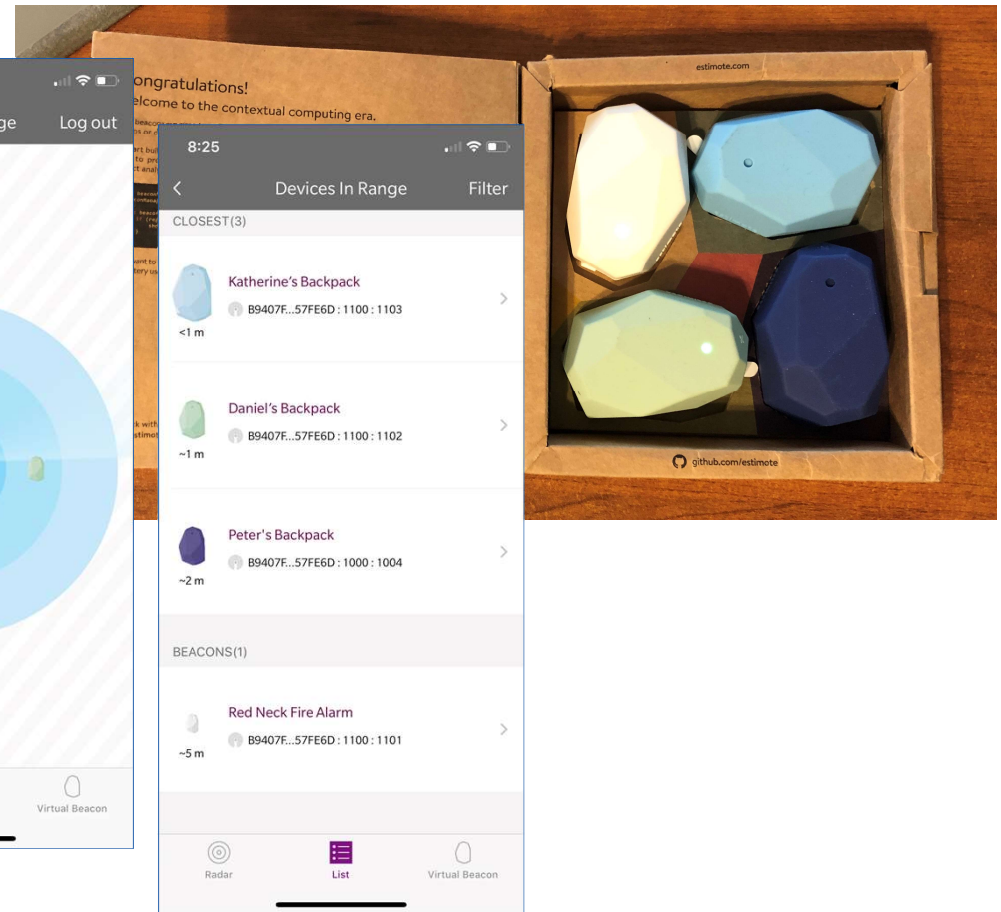
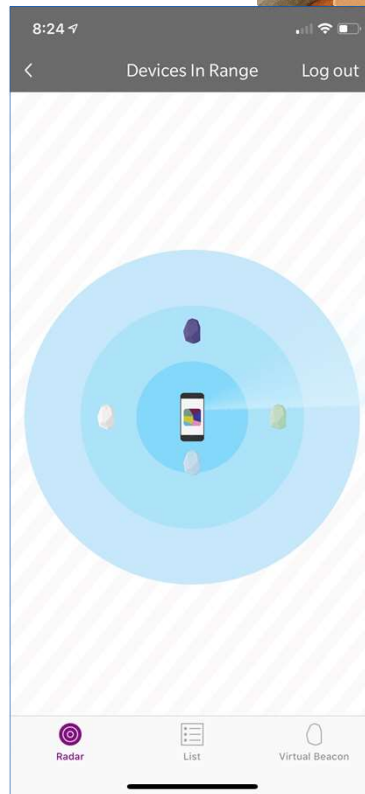
- Beacon like a lighthouse
 - Send out a signal
 - “I am here”
- How beacon works
 - Antenna
 - Bluetooth Low Energy - BLE
 - Unique identifier
 - App “sees’ beacon and takes action
 - Mobile device can be a beacon
 - Significant impact on facilities



As technology evolves beacons will be able to perform more and more functions

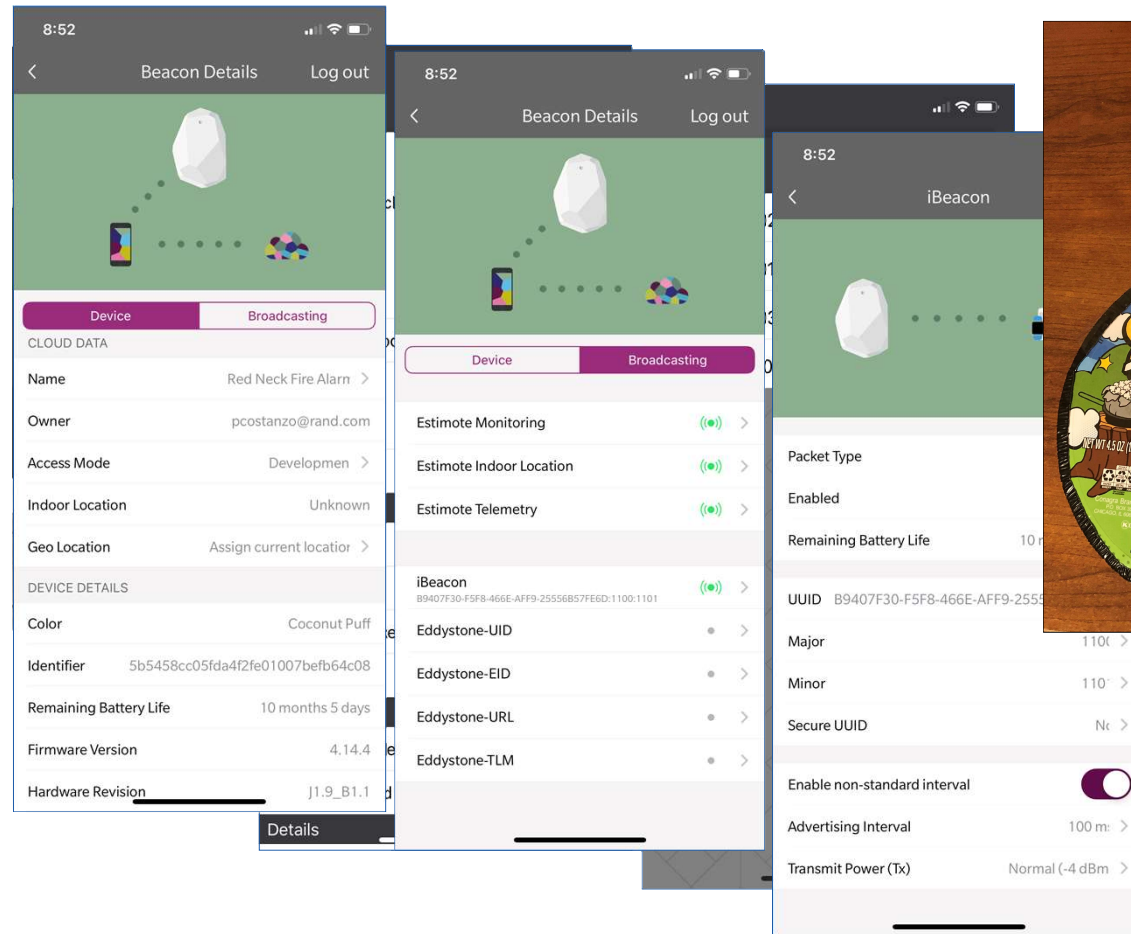
iBeacons

- Hardware
 - Estimote device
 - Leverage existing infrastructure
- Software
 - Estimote App
 - Enable and manage iBeacons



Configure iBeacons & Mobile Assets In BIM 360 Ops

- Install Estimote app
- Configure iBeacon
- Load/Link asset
- Install & deploy iBeacons
 - Critical assets
 - Red Neck Fire Alarm



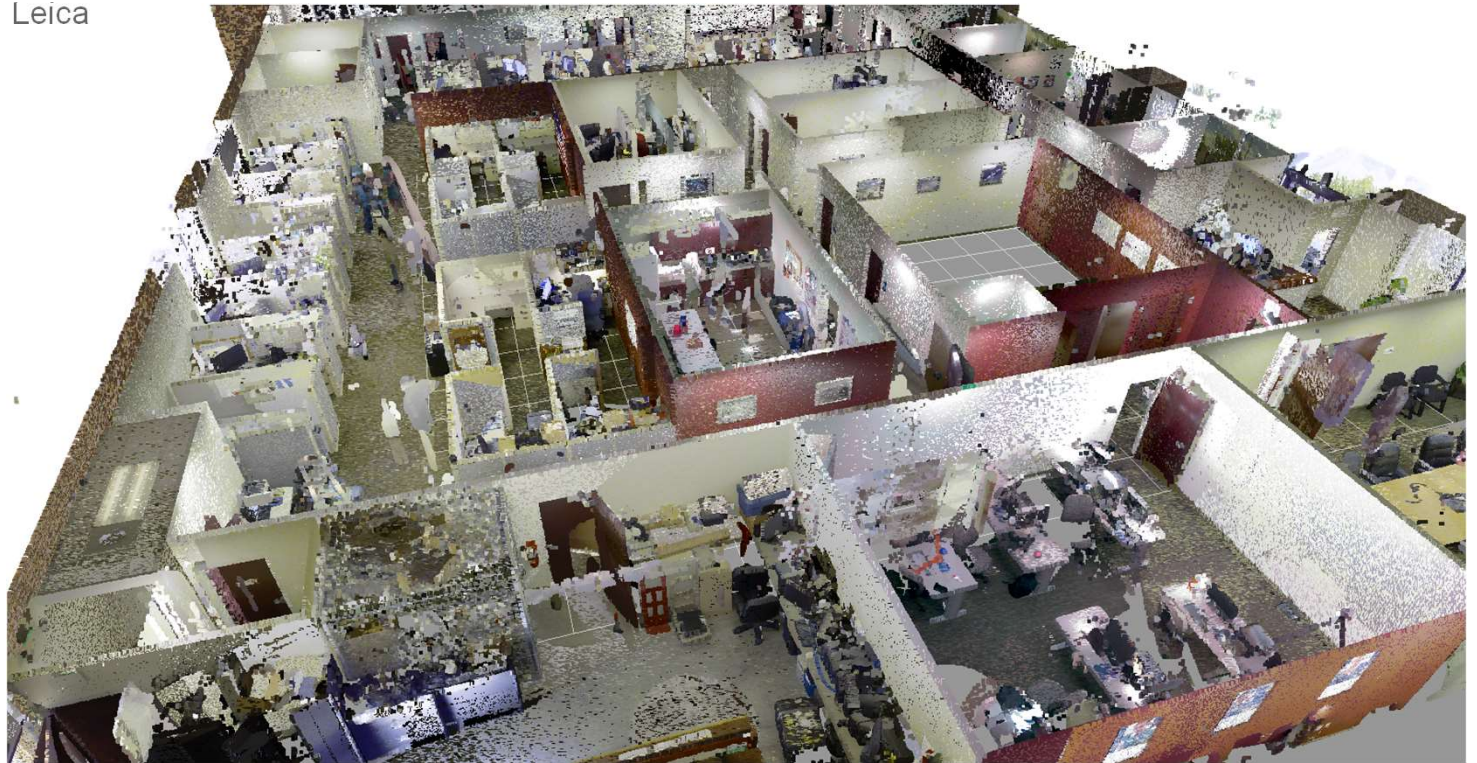
IoT is going to enable “dumb ideas” to be smart!

IMAGINiT Pilot

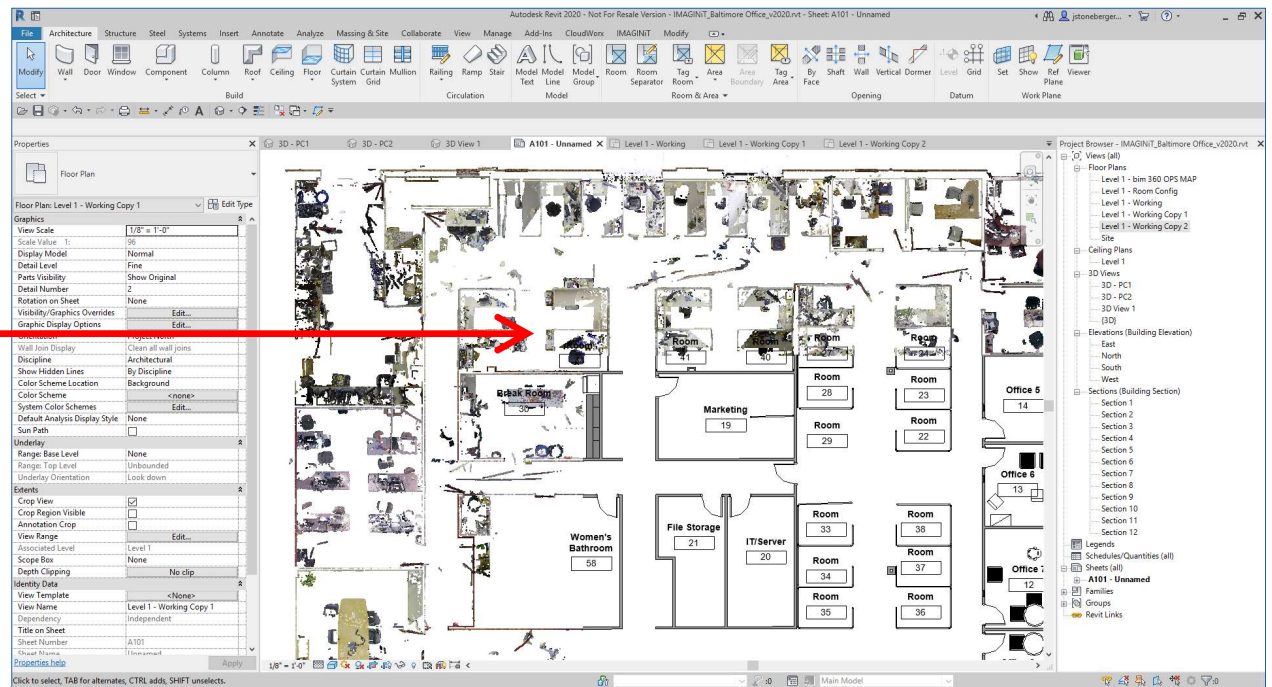
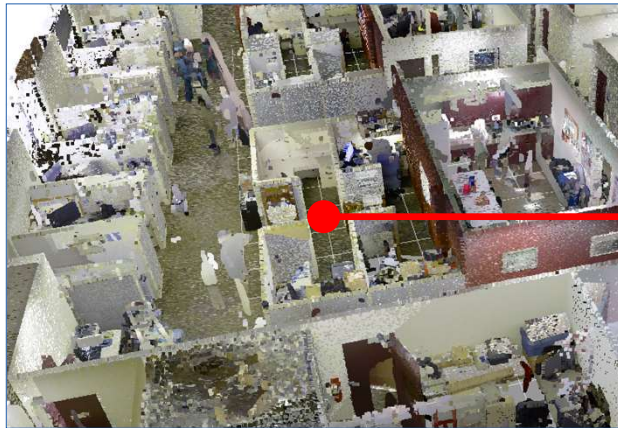


High Definition Scanning

- Scanned office with Leica
 - BLK360
 - RTC360



Point Cloud to Revit Conversion



Apple Indoor Mapping Setup

- “Owner Organization” must register
- Consultant/Partner can be added

The image displays two screenshots of the Apple Business Register interface, illustrating the setup process for an organization and its users.

Top Screenshot: Organization Profile

- Header:** Apple Business Register
- Organization:** IMAGINiT Technologies - Baltimore
- Status:** Indoor positioning is live (indicated by a green checkmark).
- Indoor Maps:** A section with a search bar and an "Add file" button.
- Left Sidebar:** IMAGINiT Technologies - B... 11201 Dolfield Blvd, Owings ...

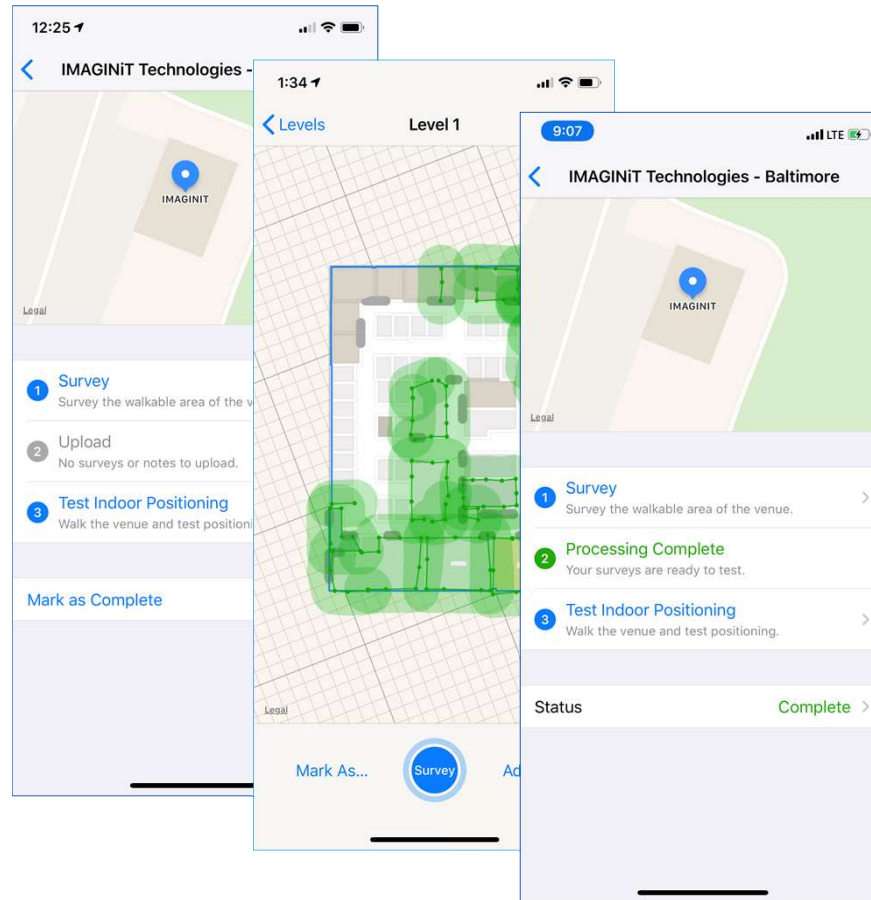
Bottom Screenshot: User Management

- Header:** Apple Business Register
- User:** Jim Stoneberger (Status: Verified, Profile is complete)
- Team Members:** A list of users with roles and status indicators.

Name	Role	Status
Jim Stoneberger	HR Admin, Administrator...	Verified
Lisa Brady	Reader	Not Verified
Mark Mergenschroer	Administrator, Indoor Su...	Verified
Peter Costanzo	HR Admin, Administrator	Verified
Robbin Gossman	Reader	Not Verified
- Roles and Permissions:** A section with an "Edit" button, listing roles and permissions.
 - Team Members - HR Administrator:** Can view and edit team members
 - Administrator:** Full organization permissions
 - INDOOR MAPS - MAP MAKER:** IMAGINiT Technologies - Baltimore, 11201 Dolfield Blvd, Owings Mills
 - INDOOR MAPS - SURVEYOR:** IMAGINiT Technologies - Baltimore, 11201 Dolfield Blvd, Owings Mills
- Right Sidebar:** Peter Costanzo (Advanced)

Apple Indoor Survey

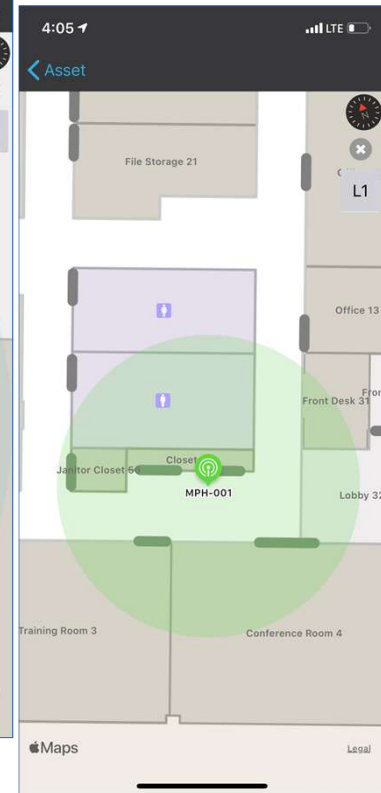
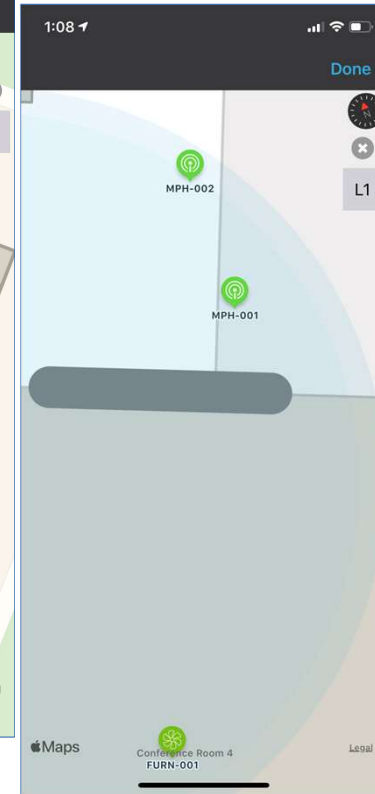
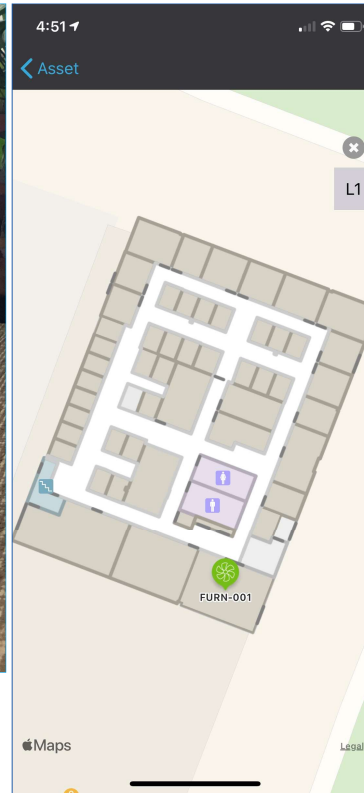
- Simple process
 - Survey
 - Upload
 - Test
- Update survey
 - Change floor plan
 - New Wi-Fi configuration
- Change your paradigm!



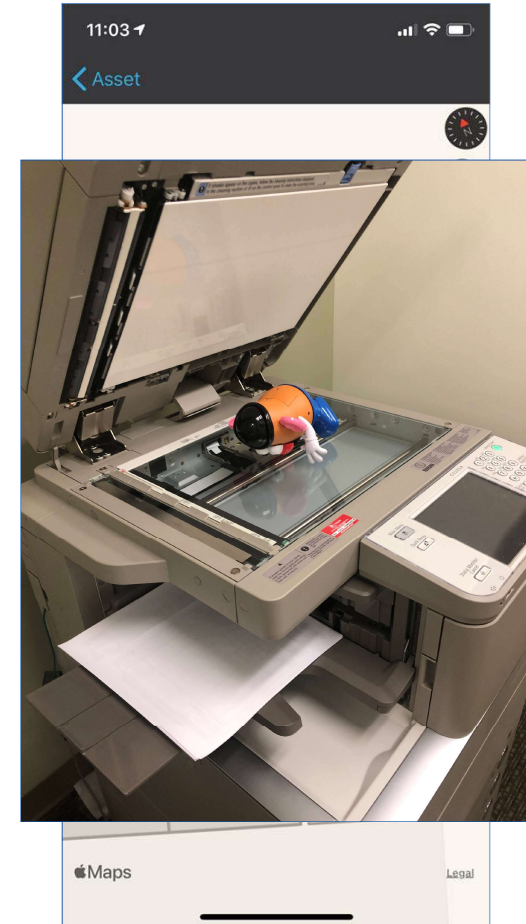
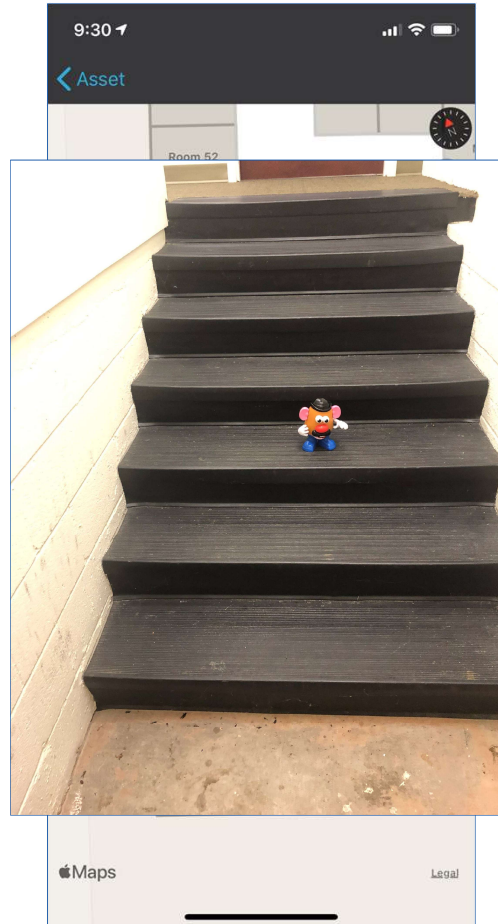
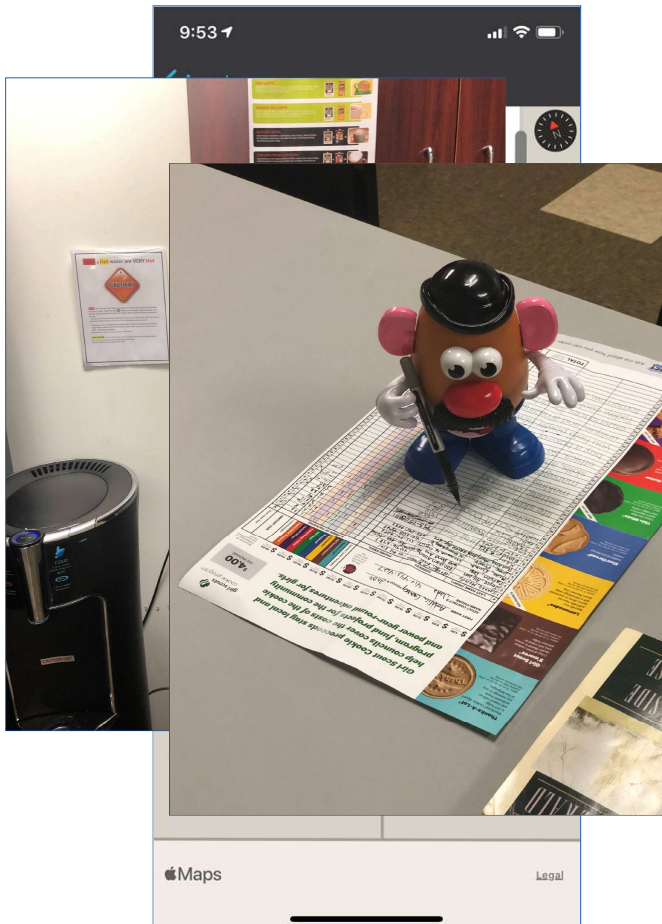
iBeacons



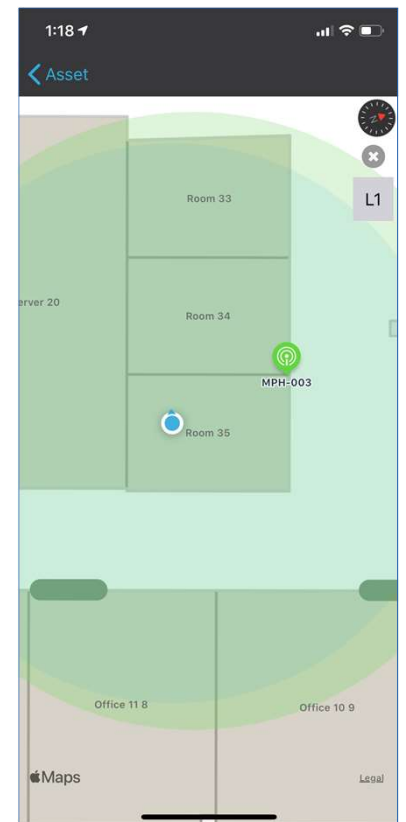
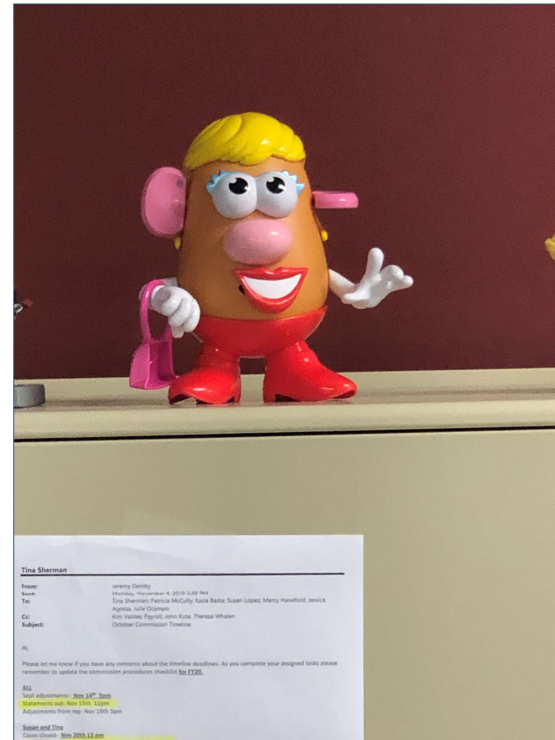
BIM 360 Ops - Tracking Mobile Assets



BIM 360 Ops - Where is Mr. Potato Head?

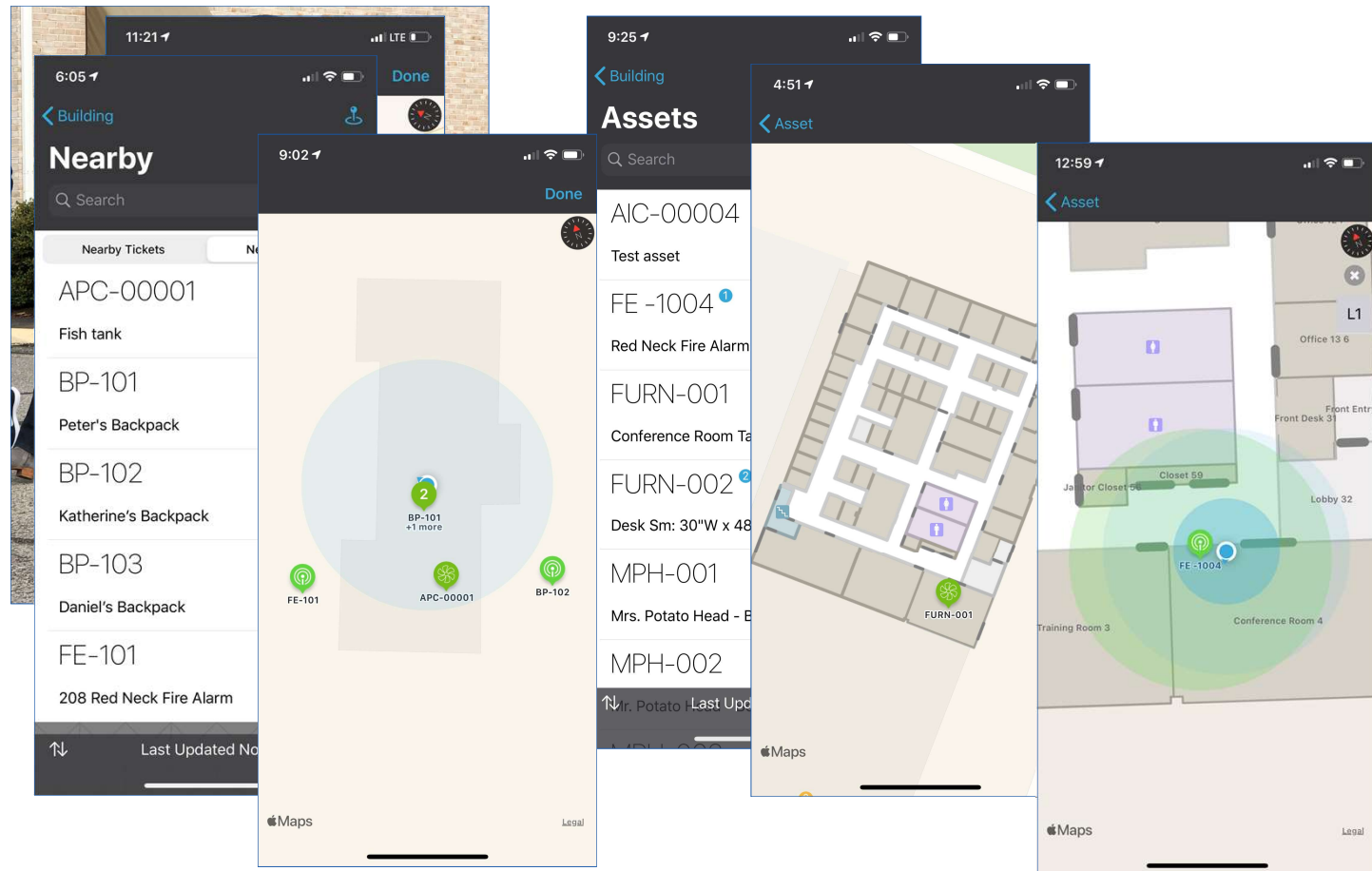


BIM 360 Ops - Tracking Mobile Assets



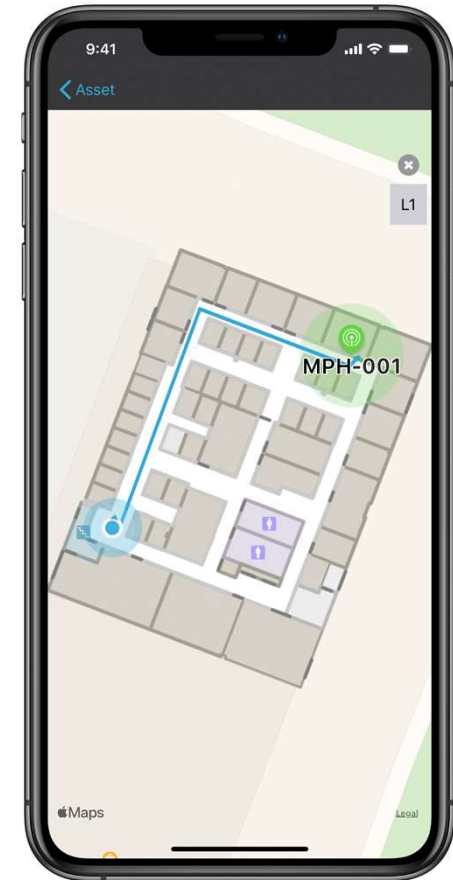
BIM 360 Ops Asset Tracking – GPS vs IMDF

- GPS only
 - Home portfolio
 - Rough estimate
 - Fixed Assets
 - Mobile Assets
- IMDF
 - Corporate portfolio
 - Location
 - Fixed Asset
 - Mobile Asset
 - My location



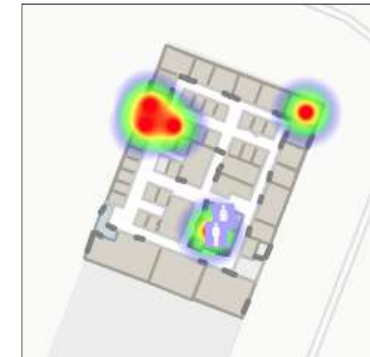
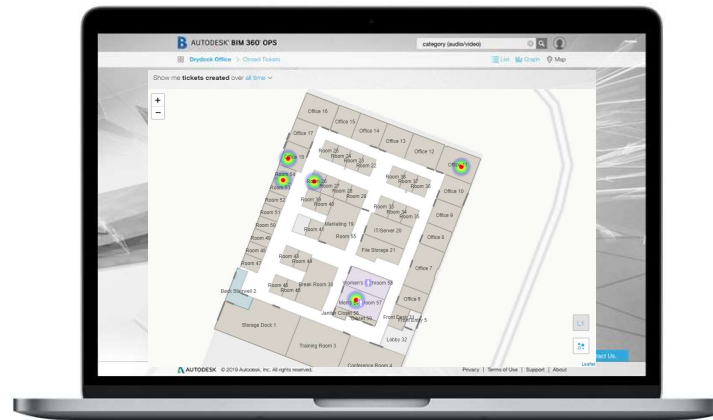
BIM 360 Ops - Wayfinding for Facility Teams

- Asset location is a major problem
 - Large building
 - Campus
 - Contractors
 - Mobile assets
 - Assets without wheels can be moved
 - **Assets with wheels disappear!**

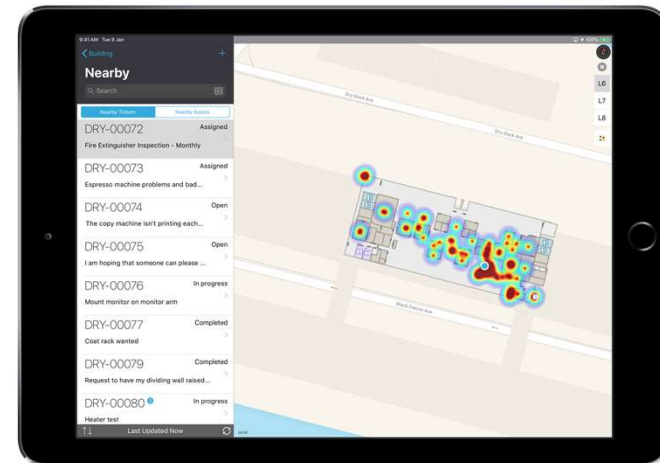


BIM 360 Ops - Heat Maps

- Identify “problem areas”
- Any category of problem types
 - “Higher maintenance” users
 - Infection control in healthcare
 - Loss prevention
 - Any sensor data

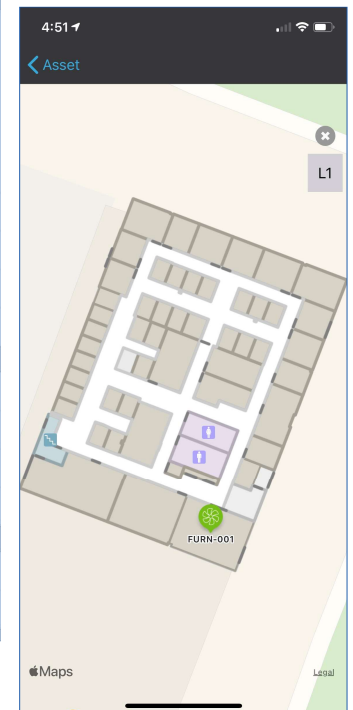
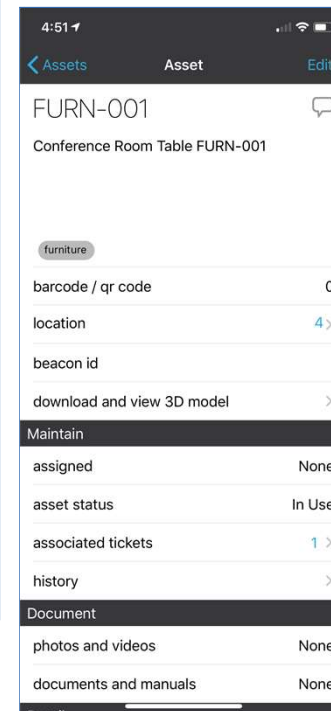
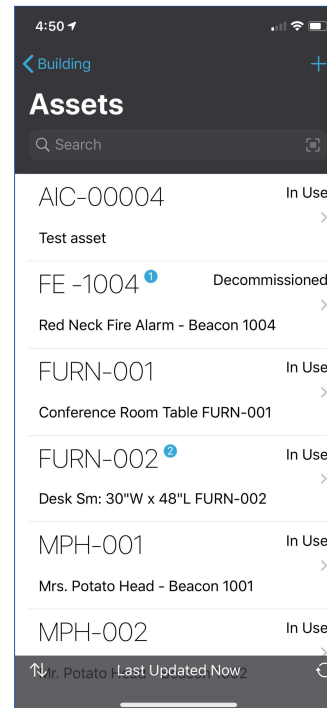
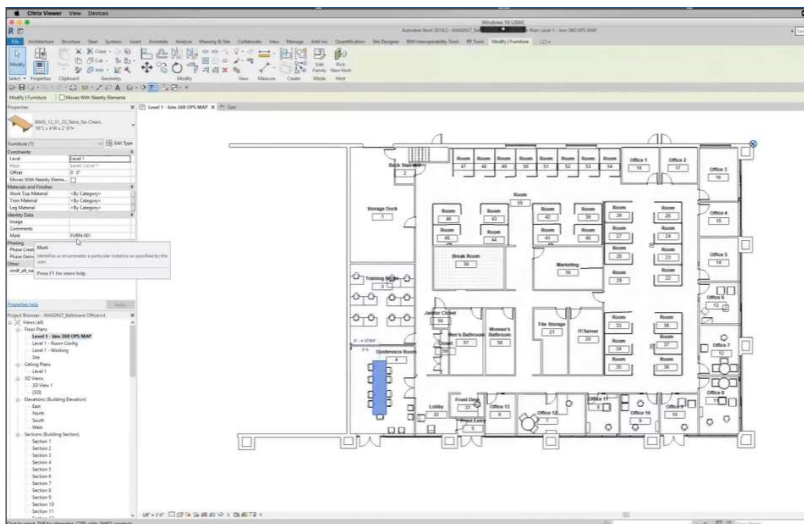


IC-00008	It's freezing in this room.	Open >
IC-00009	It is too warm in here!	Open >
IC-00010	First Hot Then Cold!!!!	Open >



Insight – Same Data, Different Views

- Revit
- BIM 360 Ops
 - List
 - Detail
- Apple Indoor Map

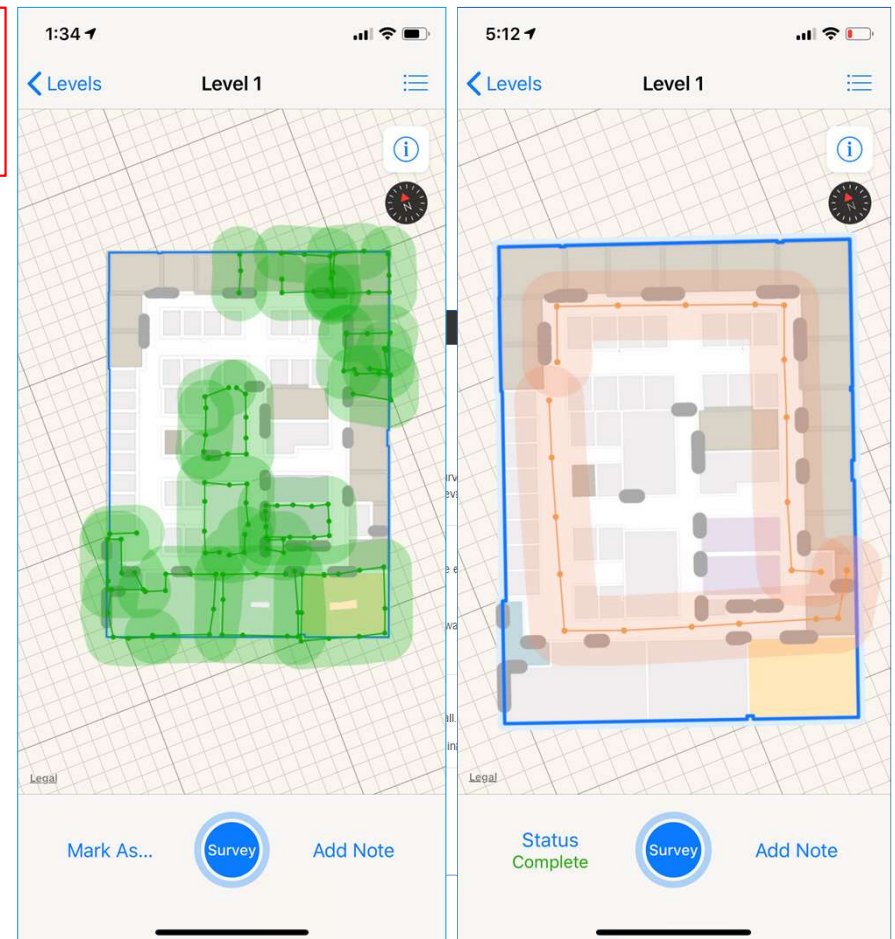


Lessons Learned

- Read documentation!
 - IMAGINiT office too small
 - Need Wi-Fi access points
- Autodesk & Apple have great resources
 - Introducing the Indoor Maps Program
 - Yuval Kossovsky
 - <https://developer.apple.com/videos/play/wwdc2019/245>
 - Autodesk BIM 360 Ops Blog
 - <https://bim360ops.autodesk.com/blog>
- Change your paradigm!

Any small building, office, shop or restaurant:

The basic rule; if a space is so small you can't get lost, indoor positioning is not appropriate.

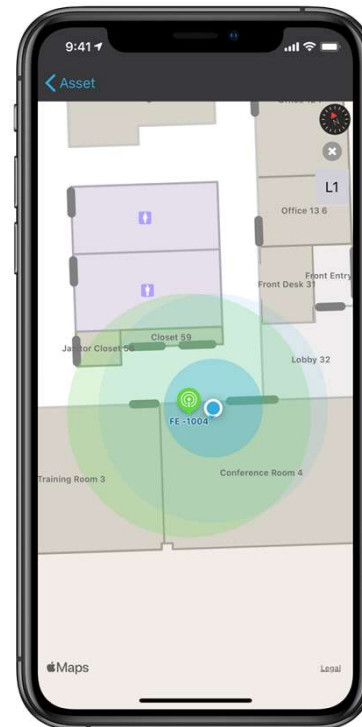
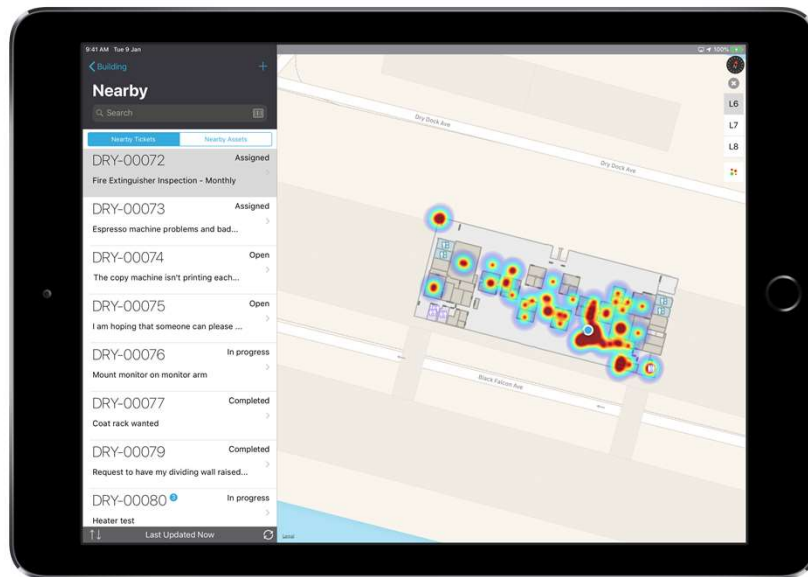


Learning Objectives



Understand the benefits of indoor mapping to facilities managers

- BIM 360 Ops :
 - Tracking mobile assets
 - Wayfinding for facilities teams
 - Better work order management using heat maps of tickets



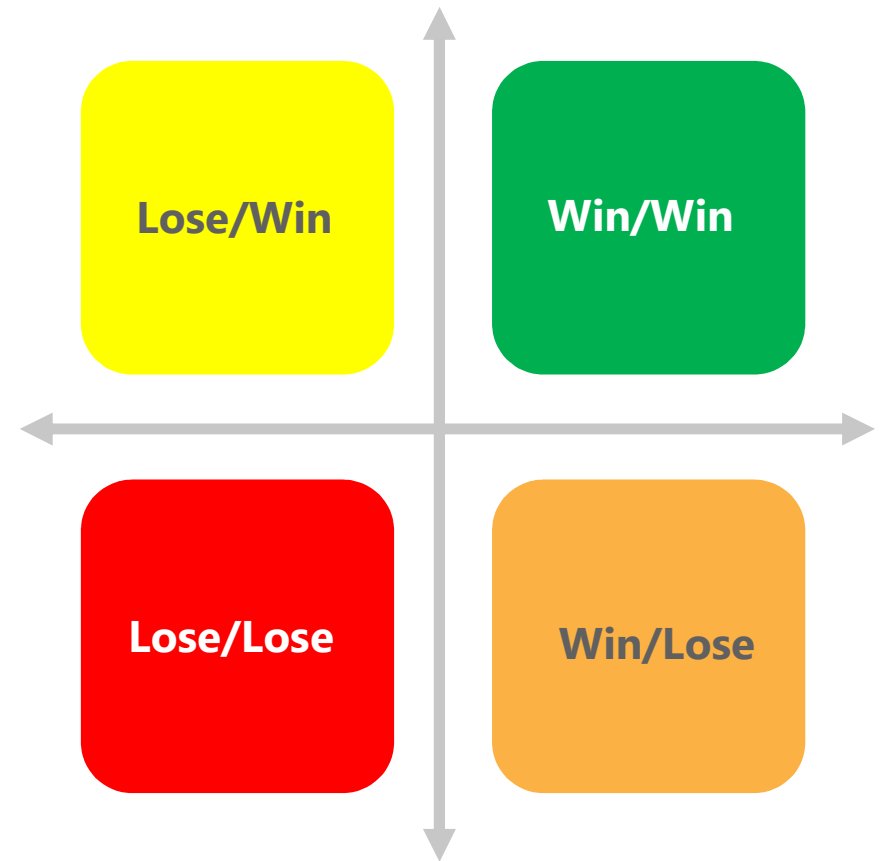
Realize the value Revit as-builts provide owners

- The largest ROI for Revit is in **Building Operations**!
- Good data enables good decisions
- Empower owners to be more efficient
 - Location of space and assets
 - Access to detailed information about assets
 - Increase ROI from assets
 - Leverage warranties – Save 14%!
 - Effective preventative maintenance from day 1
 - Predictive maintenance
 - Reduce energy costs



Identify revenue streams AEC firms can realize by preparing data for owners

- Participate in the KA-BOOM
- Everyone wants Win/Win
 - Show the owner the value
 - Show your firm the money
- Revenue streams
 - Short term - **Enhanced** facilities data handover
 - Consulting
 - Data collection
 - Data formatting
 - Increased contract value
 - Long Term
 - Model maintenance
 - Data maintenance



See how BIM data can integrate with IoT for more automated facilities management

- “Buildings are simply another network.”
 - GPS
 - Wi-Fi
- **BIM provides background & data**
- More networks/capabilities to come
 - 5G
 - Low Power Wide Area Networks
- Potentially limitless possibilities
 - “Check engine light”
 - Energy, water management
 - Life safety & emergency management
 - Security
 - Etc., Etc., Etc.



Questions

Thank you for attending the session!





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