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BLD322245
Indoor Mapping for Facility Operations

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Learning Objectives

- Understand the benefits of indoor mapping for facilities managers.
- Realize the value Revit as-built models provide owners.
- Identify revenue streams AEC firms can realize by preparing data for use by owners.
- See how BIM data can integrate with IoT for more automated facilities management.

Description

Leveraging BIM data enables facilities managers to more effectively populate facilities management systems through importing data. In addition to this, IoT is having a significant impact to both locating and providing data about assets. This presentation demonstrates how using Revit models with BIM 360 Ops and iBeacons provides:

1. Wayfinding for facilities teams
2. Tracking of mobile assets
3. Better work order management using heat maps of tickets

The sessions will include best practices, case studies, and lessons learned from pilot and active projects.

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Peter Costanzo, FMP
Director, Facilities Management
IMAGINiT Technologies

Peter Costanzo is the Director of IMAGINiT Technologies Facilities Management Division. Peter's unique background which includes, hardware, software, mobile computing, BIM and facilities provides him expertise not only in IoT but individual technologies and processes it is based on.

Peter has a BS in Physics, MBA in Marketing and recently received his Facility Management Professional (FMP) certification through the International Facility Management Association. Peter is an evangelist for the practical use of technology within facilities management. Peter has presented at Autodesk University, Digital Built Week, Canada BIM Council Conferences and the Campus FM Technology Conference. Peter regularly conducts webinars not only for IMAGINiT but for other organizations, the most recent being The Architect's Newspaper in fall of 2019. Peter has articles on the application of technology in facilities management published on a regular basis and also blogs on the subject.

Jim Stoneberger

[Add your bio(s).]

Technology & Process Overview

There are several different technology components that are involved in this class. The following chart illustrates where they fit into the process.

Revit – 360 Ops – Apple Indoor Mapping Program – iBeacons -

Revit & Potentially High Definition Scanning

An accurate Revit model (Building Information Model-BIM) is required Indoor Mapping Data Format (IMDF). Although not necessary, IMAGINiT created a high definition scan of our facility which was then converted to Revit. An assumption is made that the reader has familiarity of Revit and high definition scanning (HDS). HDS is rapidly evolving bringing down the cost. The resource section contains information on this in case the reader is not aware.

360 Ops

Basic description of 360 Ops here.

Ops-Indoor Mapping Integration

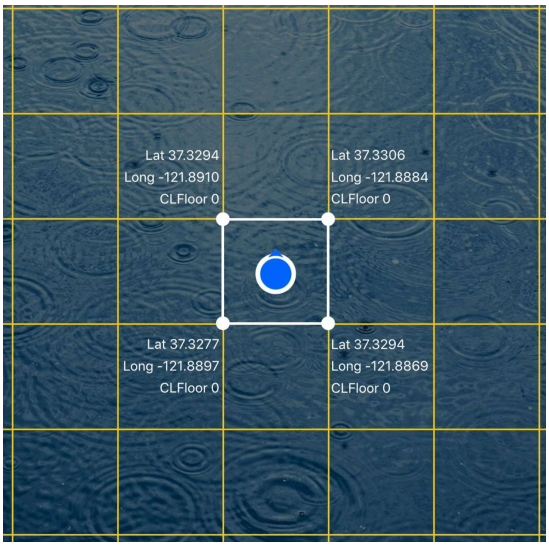
Basic description of linking Revit model with Ops

Walk through process using IMAGINiT Pilot Data example

Apple Indoor Mapping Program

Basic description of Apple Indoor mapping program

Apple had a great explanation of how indoor positioning works in the video referenced in last section of this document. Similar still pond where a drop of rain falls on the surface, an access point creates similar ripples. Multiple access points create multiples ripples that intersect. If a grid is laid over this, each grid will have a unique texture of ripples which Apple calls “the fingerprint”. The IMDF contains the latitude and longitude for each box in the grid and apple can detect a beacon or apple device within that grid.



Apple Indoor Survey

Description of the Apple Indoor Survey App
Instructions on how to conduct the Apple Indoor Map Survey
Walk through process using IMAGINiT Pilot Data example

iBeacons

Basic overview on iBeacon technology.

Hardware

Discussion of estimote beacons that were used in this project.

Software

Description of estimote App
Instructions on configuring iBeacons
Walk through process using IMAGINiT Pilot Data example

IMAGINiT Indoor Mapping Pilot

IMAGINiT set up a pilot project in our corporate offices which included the following three use cases related to asset location:

Tracking of mobile assets

Insert screen shots here.

Wayfinding for facilities teams

Insert screen shots here.

Better work order management using heat maps of tickets

Insert screen shots here.

Learning Objectives

This class had several learning objectives. The prior pages focus on the technology components and walk the reader through the steps involved in setting up indoor mapping illustrating the steps IMAGINiT went through. While it is important to understand the technology and process, the learning objectives

Understand the benefits of indoor mapping for facilities managers.

Indoor mapping benefits facilities managers by:

- Enabling them to locate mobile assets
- Assisting employees or contractors who would not be familiar with a facility how to get to the correct location

Realize the value Revit as-built models provide owners.

- A large problem owners face is identifying where assets are located
- Most owners don't have simple AutoCAD drawings up to date much less a rich model
- BIM has the ability to provide owners not only information on where their assets
- BIM data can be leveraged during the maintenance phase of a building for significant cost savings.
    -

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

Most owners aren't ready for BIM. Also, the owners that have adopted BIM are still at the beginning of the adoption curve of BIM for owners. Potential revenue streams for AEC firms, which provide the owners great value include:

1. BIM standard development
2. BIM standard consulting, education
3. Increased project consulting services identifying data elements within BIM
4. Managing models post construction
5. Integrating BIM data with an owner's facility management system(s)
6. Potential high definition scanning datasets the owner can leverage

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

IoT is going to have a huge impact on facilities. Use cases include but are not limited to:

- Wayfinding for facilities teams
- Tracking of mobile assets
- Better work order management using heat maps of tickets
- Extended asset lifespan due to increased preventative maintenance
  - Indication of when an expensive asset is not running properly
  - (Check engine light for facility assets.)
  - Problems can be pro-actively dealt with extending the asset's life
- Using sensors for environmental needs
  - Temperature, humidity – general environment
  - More advanced – specialized environments
- Location of employees

Resources

Following are a list of resources:

Apple Indoor Maps Program - https://register.apple.com/indoor

Video Introducing the Indoor Maps Program –

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

Autodesk 360 Ops - https://www.autodesk.com/products/bim-360-ops/overview