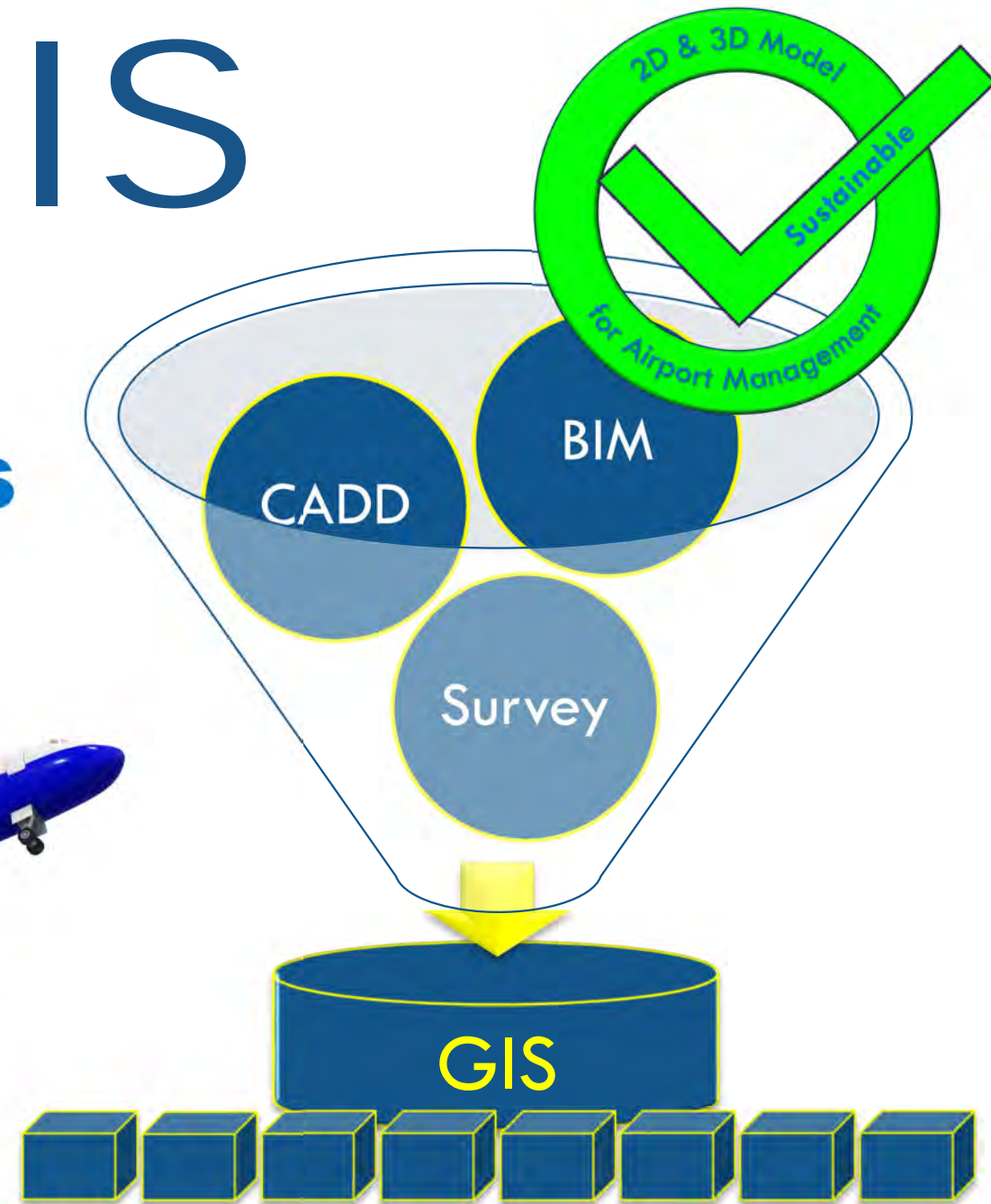


# BIM<sub>vs</sub>GIS

**What  
Airport Owners  
Should Do ?**



by David Tamir

**T.A.M.I.R.ONICS**

Technology Applications Management with Intelligent Results

March 2020

AAAE Geospatial Technologies Conference

# Presentation Outline

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- ❑ Introduction & Definitions
- ❑ Airport Owner's Spatial Data Lifecycle
- ❑ Airport Mgm't Data Needs (2D vs 3D)
- ❑ Sample Options
- ❑ Recommendations



# Introduction

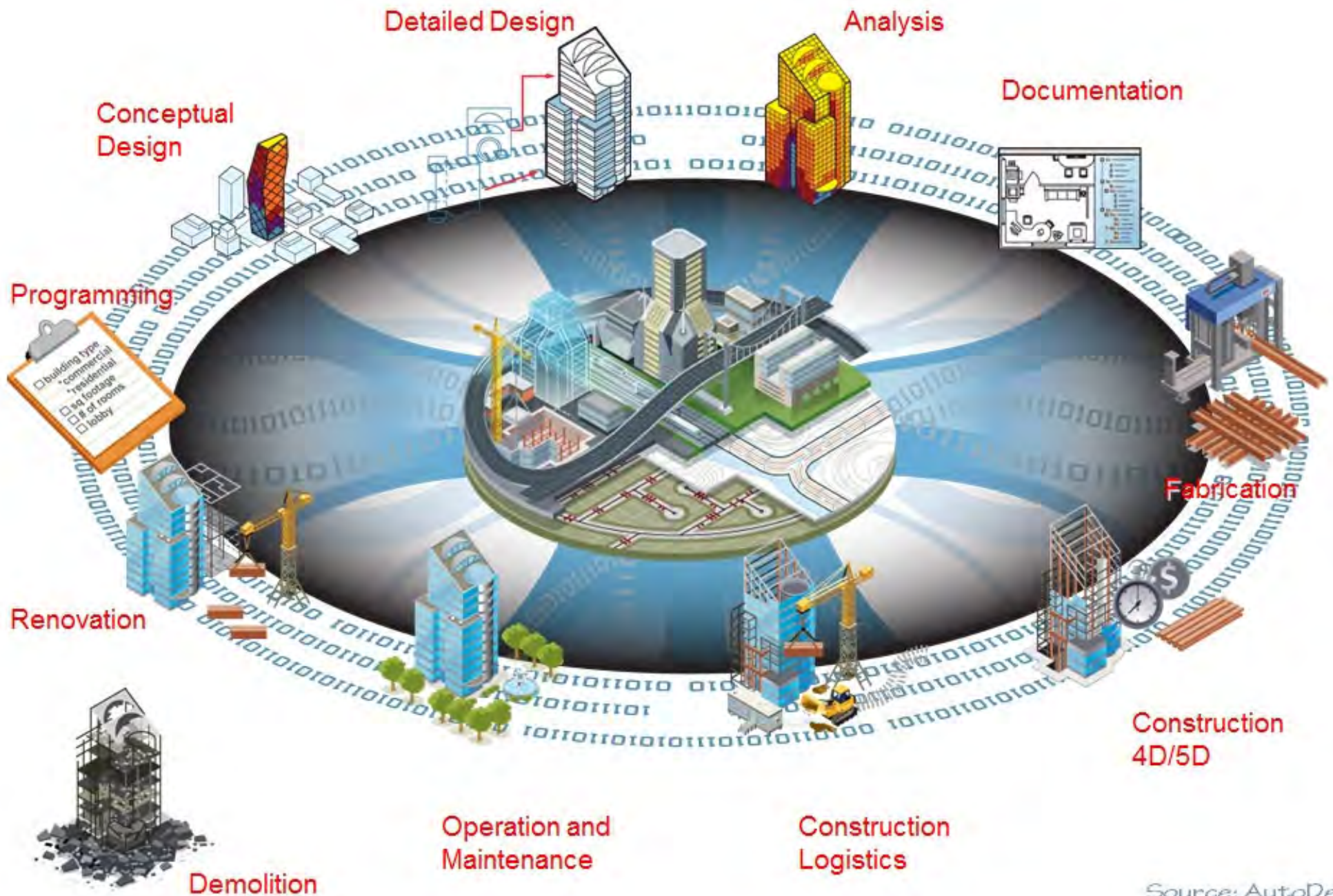


- ❑ **BIM is fantastic** for AEC firms  
(Architecture - Engineering - Construction)
- ❑ **Many airport projects** (e.g., tenant modifications, facilities maintenance modifications, IT mod's, etc.) are **NOT captured in BIM**; leading quickly to BIM model obsolescence
- ❑ If maintaining 2D floor plans is challenging, then 3D is more challenging and more expensive





# BIM



# “As-Builts”

- ❑ Record Drawings Incorporating Construction Redlines
- ❑ ASCE Grade Level “D” (i.e., Theoretical, non-Surveyed)
- ❑ 90% of BIM Models are Grade Level “D”
  - ❑ LOD-100: Programmatic Conceptual Design
  - ❑ LOD-200: Approximate Design
  - ❑ LOD-300: Precise Design To-Be-Built
  - ❑ LOD-400: Fabrication, Assembly & Installation Details
  - ❑ LOD-500: Laser Scanned As-Built
- ❑ As-Builts are a Snapshot of Project Delivery

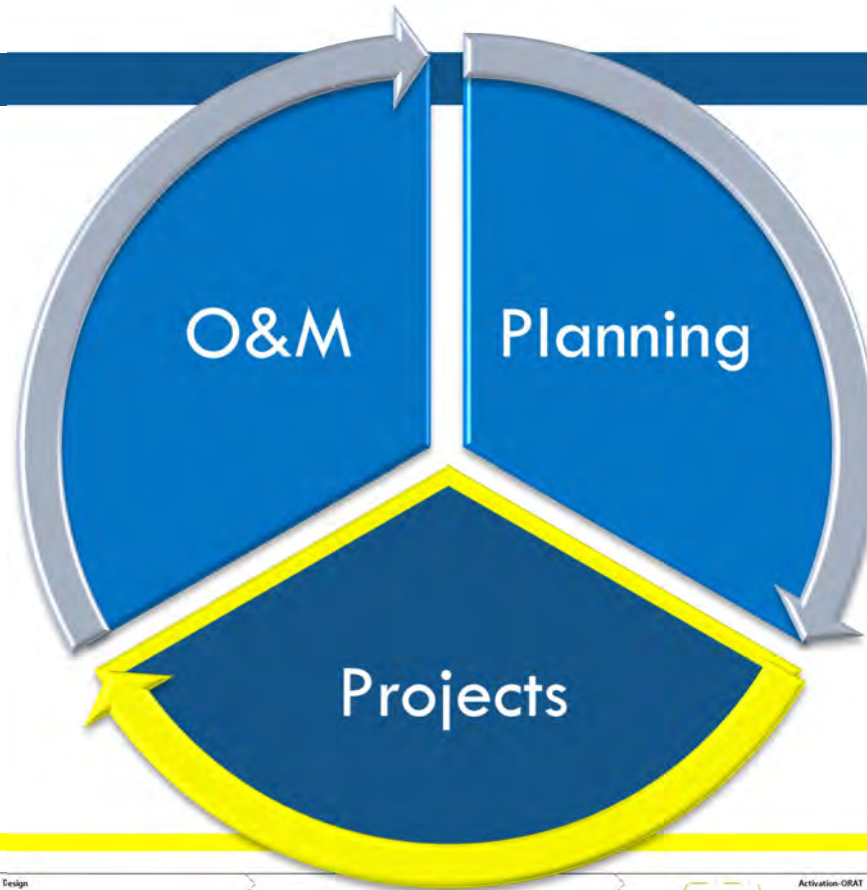


Level of Development (LOD)

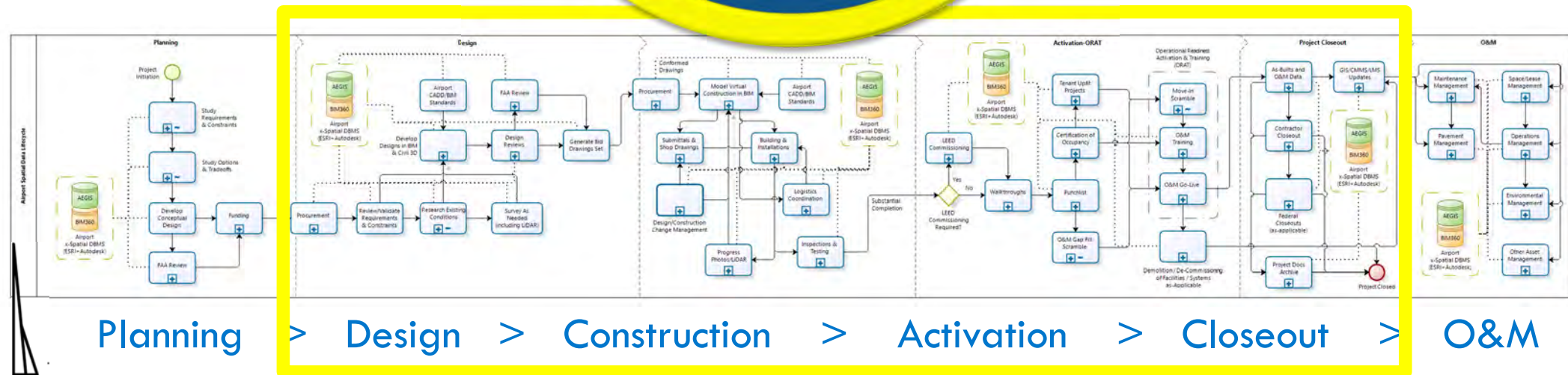


# Airport Owner's Spatial Data Lifecycle

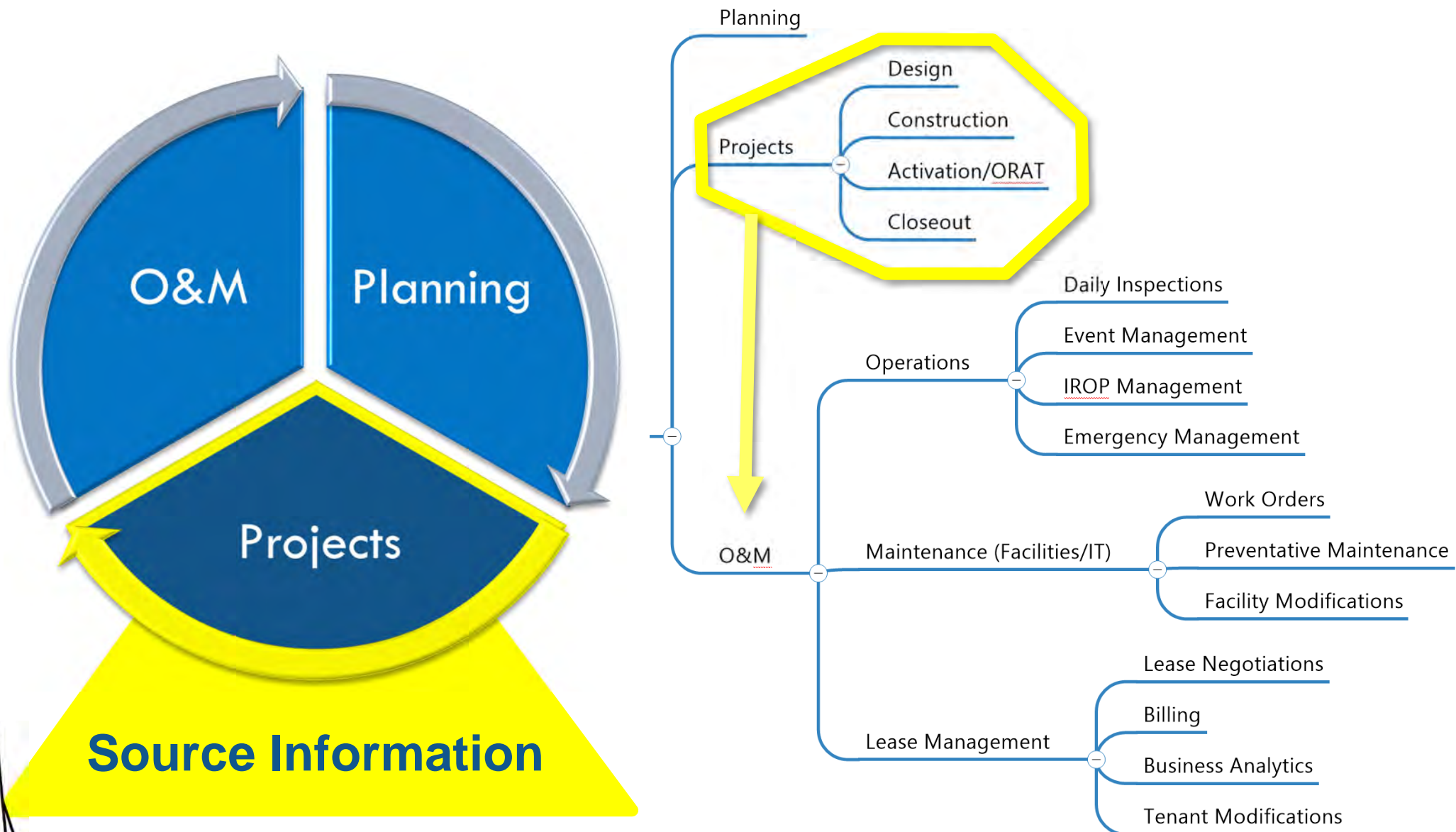
**Most Data  
Generated  
During  
Projects**



**When We  
Have Lots  
of Project  
Funding  
\$\$\$\$,\$\$\$\$,\$\$\$\$**



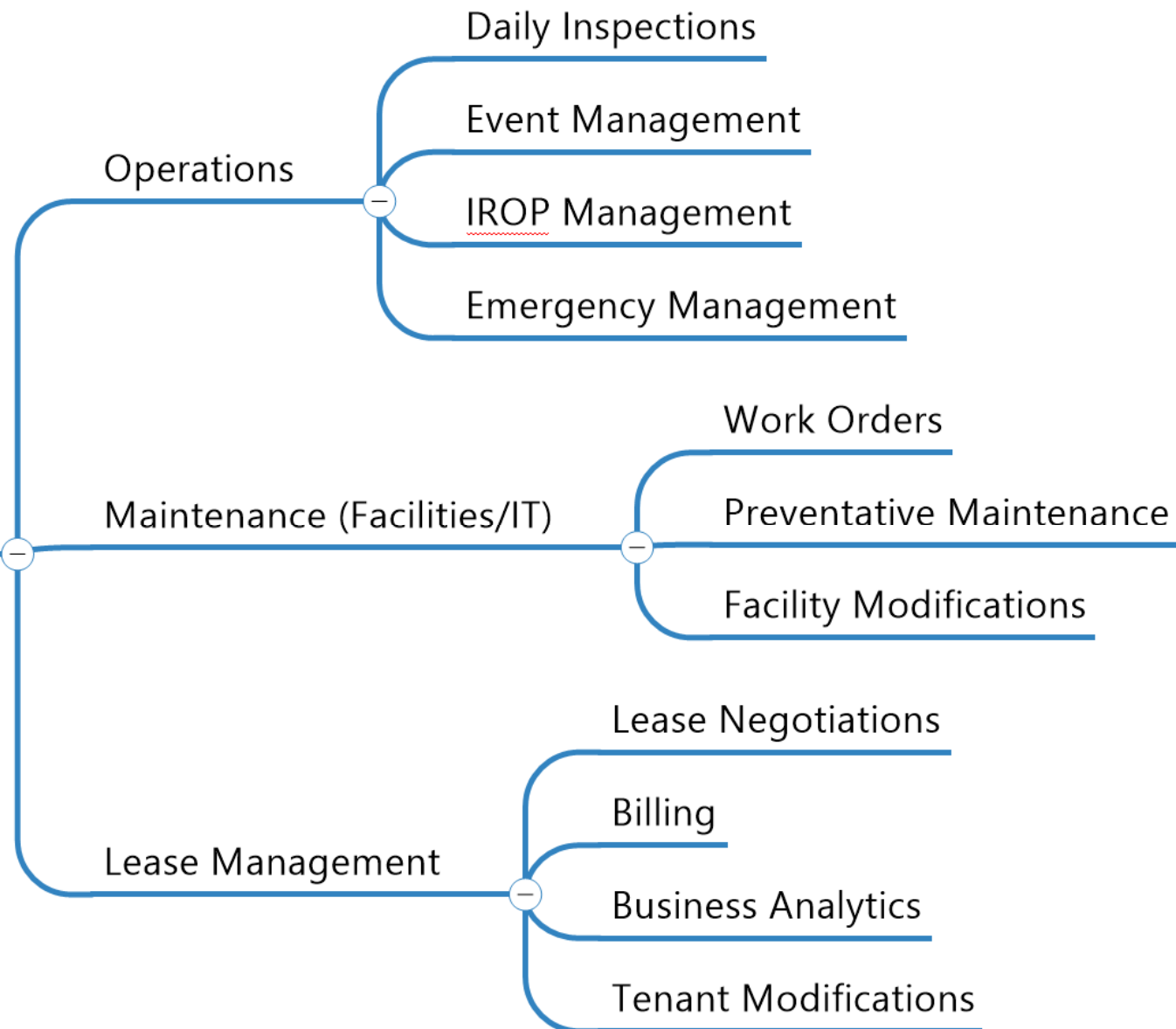
# Airport Owner Collects Project Data



# Airport Owner's O&M Applications

**Harvest  
& Distill  
Project Data  
to Support  
O&M**

**Sustain  
Only  
Business  
Essential  
Data**





# Airport Owner Needed Data

Airport Spatial Assets	Both 2D & 3D	2D	3D
FAA AGIS (Outdoors)	Sustainable via GIS		
Airfield (e.g., runway, taxiway, apron, areas, lights, signs, markings)		Yes	Maybe
Airspace (e.g., surfaces, obstructions, protection area)		Yes	Yes
Cadastral (e.g., boundary, parcel, zoning, easement, land use, trade zones)		+Yes	No
Environmental (e.g., HAZMAT, fauna, flora, flood zones, wetland, noise)		Yes	Yes
Geospatial (i.e., airport control points, PACS/SACS, coordinate grid, contours)		Yes	Yes
Man Made Structures (e.g., building, construction area, roof, fence, gate, tower)		Yes	Yes
NAVAIDs (i.e., equipment and protection zones)		Yes	Yes
Security (e.g., areas, perimeter lines)		Yes	Maybe

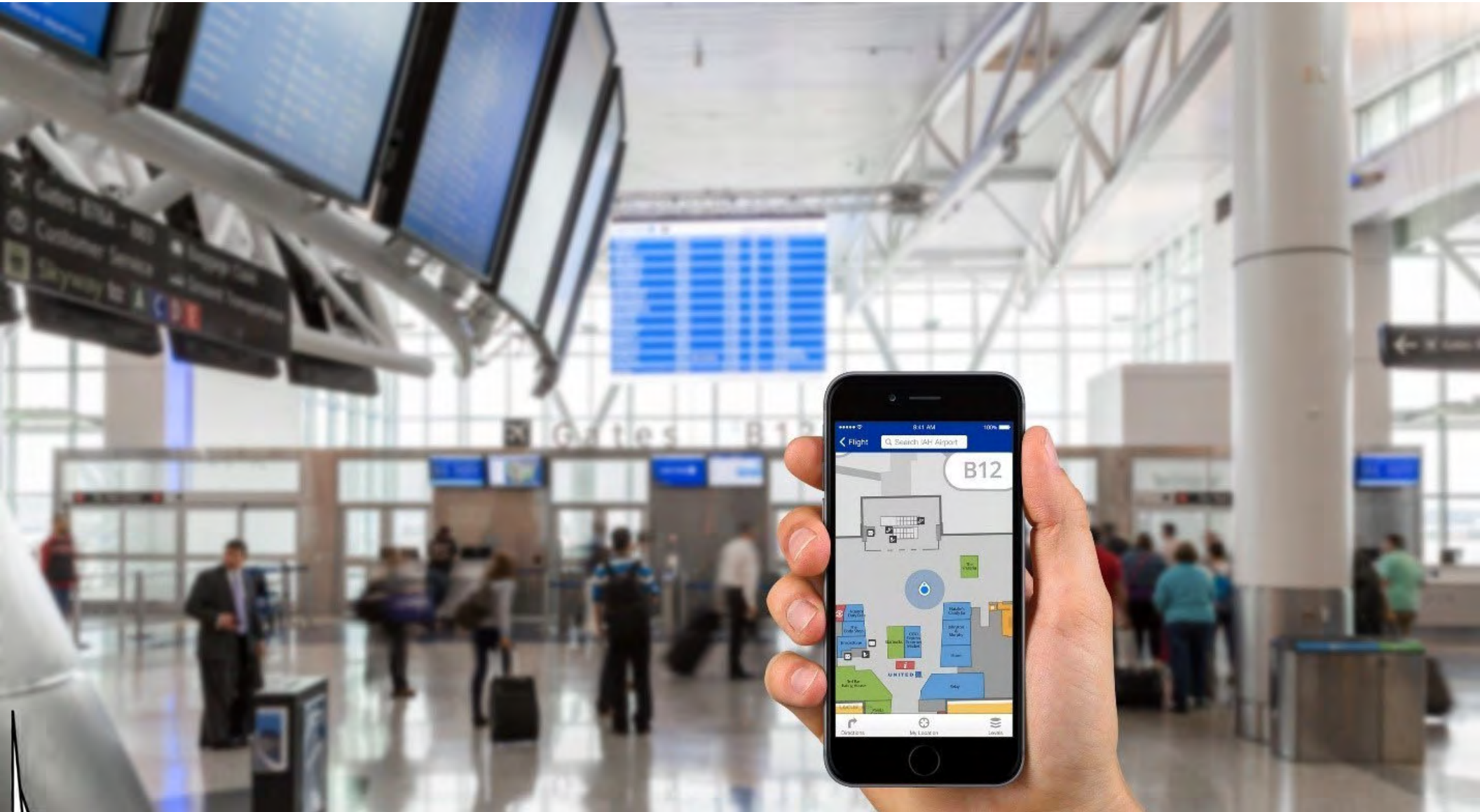
# Airport Owner Needed Data (cont')

Airport Spatial Assets		2D	3D
Surface Transportation (e.g., bridge, road, parking, rail, tunnel, sidewalk)		Yes	Yes
Utilities (i.e., above ground & subsurface)		Yes	Yes
Airfield Pavement Sections & Conditions (i.e., for PCI)		Yes	No
Project Boundaries (Historic-Current-Future)		Yes	No
Lease Boundaries (outside)		Yes	No
Lease Boundaries (inside)	Both 2D & 3D	Yes	No
Terminal Floor Plans	Sustainable via GIS	Yes	Maybe
Non-Terminal Floor Plans		Yes	No
Cameras-Sensors-Alarms		Yes	Maybe

# Airport Owner Needed Data (cont')

Airport Spatial Assets		2D	3D
High Priority FF&E (e.g., escalators, elevators, conveyors, displays, AEDs, etc...)		Yes	No
Lower Priority FF&E (e.g., light fixtures, furnishings, artwork, etc...)		Yes	No
Indoor Utilities		Yes	Maybe
IT/Communication Infrastructure	Both 2D & 3D	Yes	Maybe
Publications (map production)	Sustainable via GIS		
ALP		Yes	No
Exhibit-A (Property Acquisition Map)		Yes	No
Composite Lease Exhibit		Yes	No
Signage & Markings Plan (Part of Airport Certification Manual)		Yes	No
Security Plan		Yes	No
Emergency Grid / Map Book		Yes	No

# Mapping is Most Practical in 2D





# Airport Assets Symbolized in 2D









# Airport Assets Symbolized in 2D

The screenshot displays the IMTC (Infrastructure Management Tool) web application interface. The main map area shows a 2D representation of airport assets, including buildings and equipment, symbolized in various colors (yellow, red, blue, green). The map is overlaid with a grid and includes a scale bar. The left sidebar contains a 'Layers' panel with a tree view of asset categories (e.g., CCTV, Emergency Info, Equipment) and a 'Data Explorer' panel showing a hierarchical view of the data. The right sidebar contains a 'Map Position' panel with navigation controls and a 'Quickview' panel with a list of map tools. The bottom section of the interface shows a 'Data Administration View' for the 'Feature Class: buildings\_safety'. This view includes a table with columns for 'Primary Key Identifier', 'Unique Data Identifier', 'Name', 'Datalink ID', 'Location', 'Date Created', and 'Date Last'. The table displays two records, each with a set of icons for editing and deleting the data.

**Data Administration View** Feature Class: buildings\_safety

	Primary Key Identifier	Unique Data Identifier	Name	Datalink ID	Location	Date Created	Date Last
 	21640067	21640067	T4SC-1	21640067	LAX	2016/06/27@09:34:16	2016/07/18@15:56:26
 	21640068	21640068		21640068	LAX	2016/06/27@09:34:10	2016/07/18@15:56:26

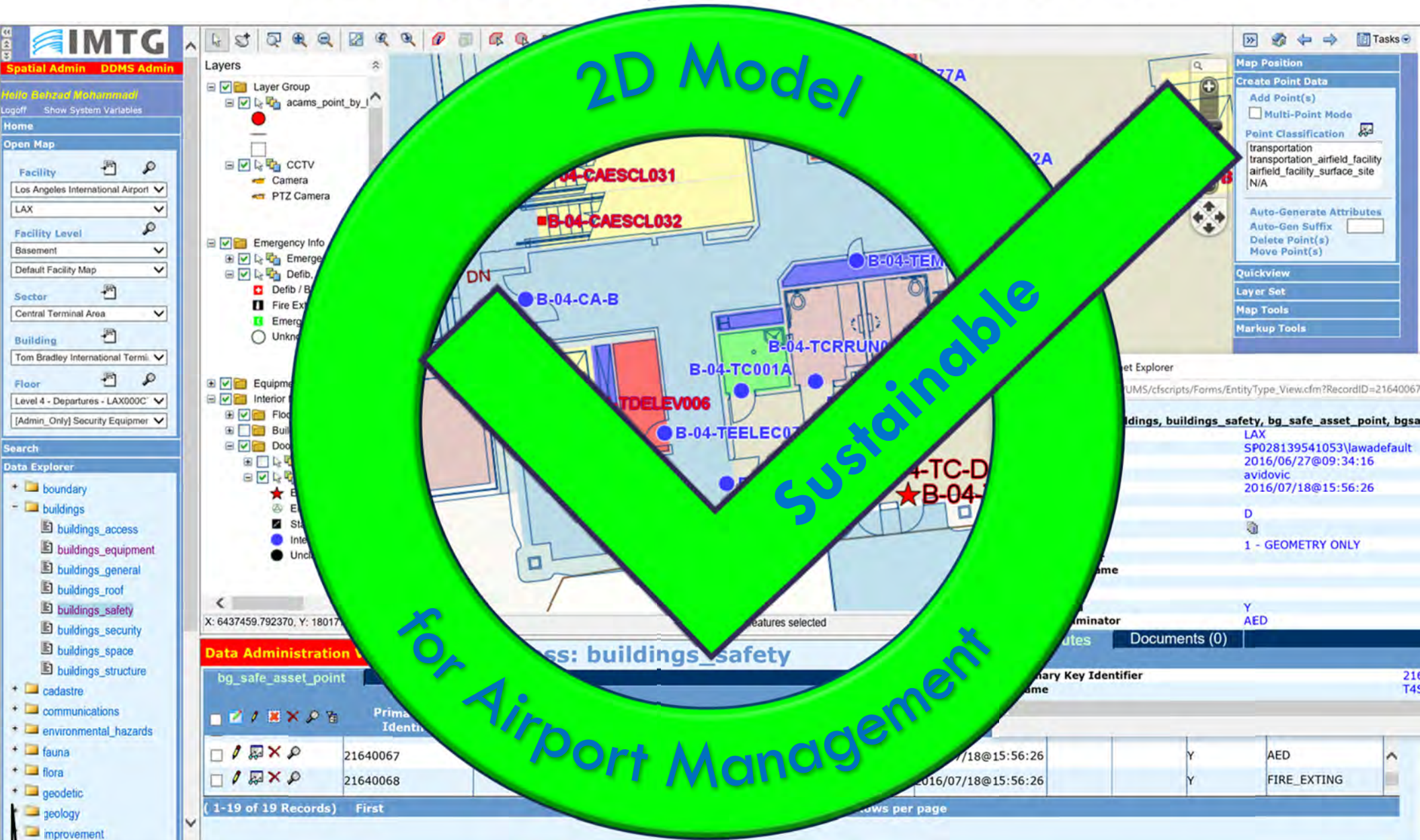
( 1-19 of 19 Records ) First Show 25 Rows per page

Data May be Sustained via Web UI

Courtesy of LAX &  
**X·SPATIAL**



# Airport Assets Symbolized in 2D

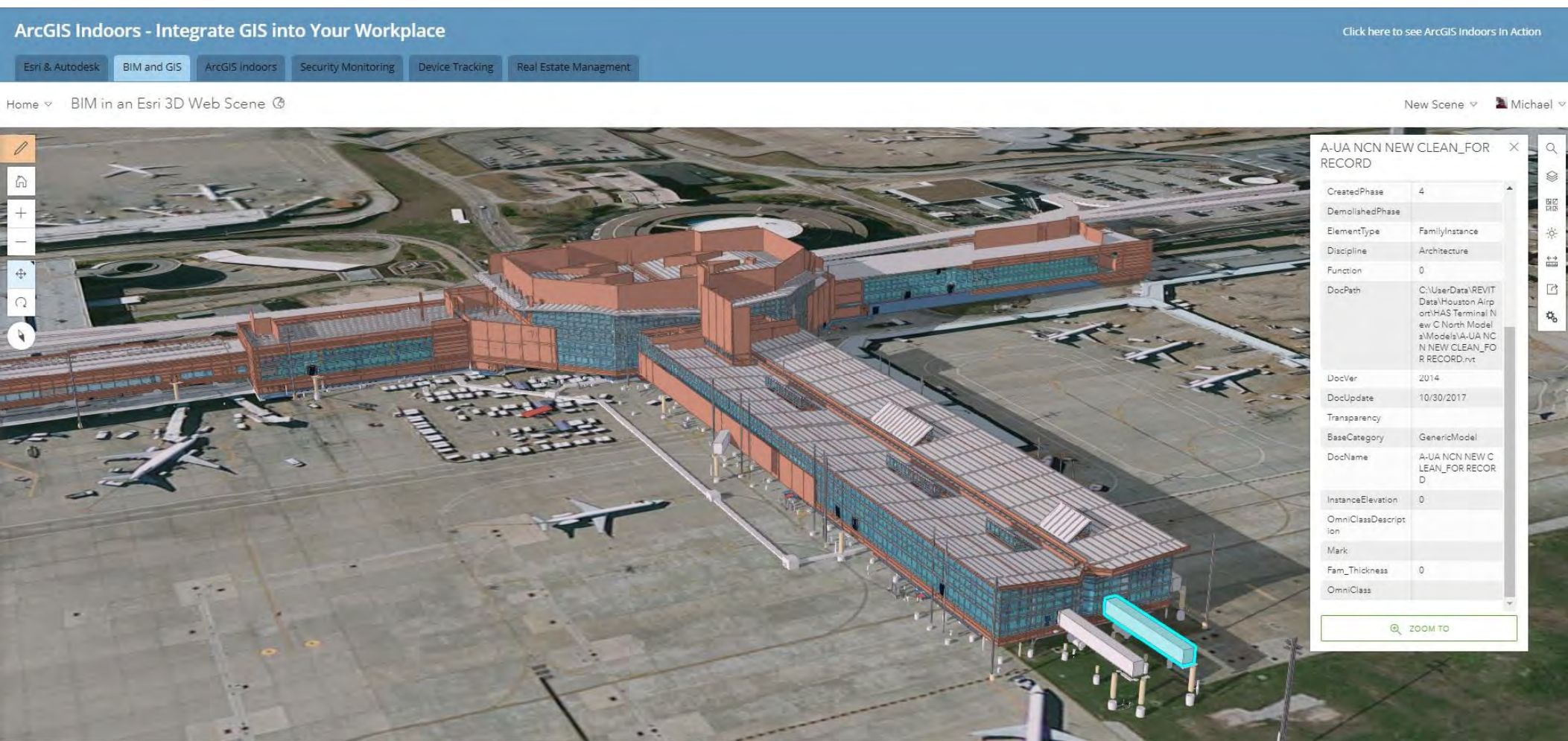


Data May be Sustained via Web UI

Courtesy of LAX &  
**X·SPATIAL**



# ESRI ArcGIS + Revit Interoperability



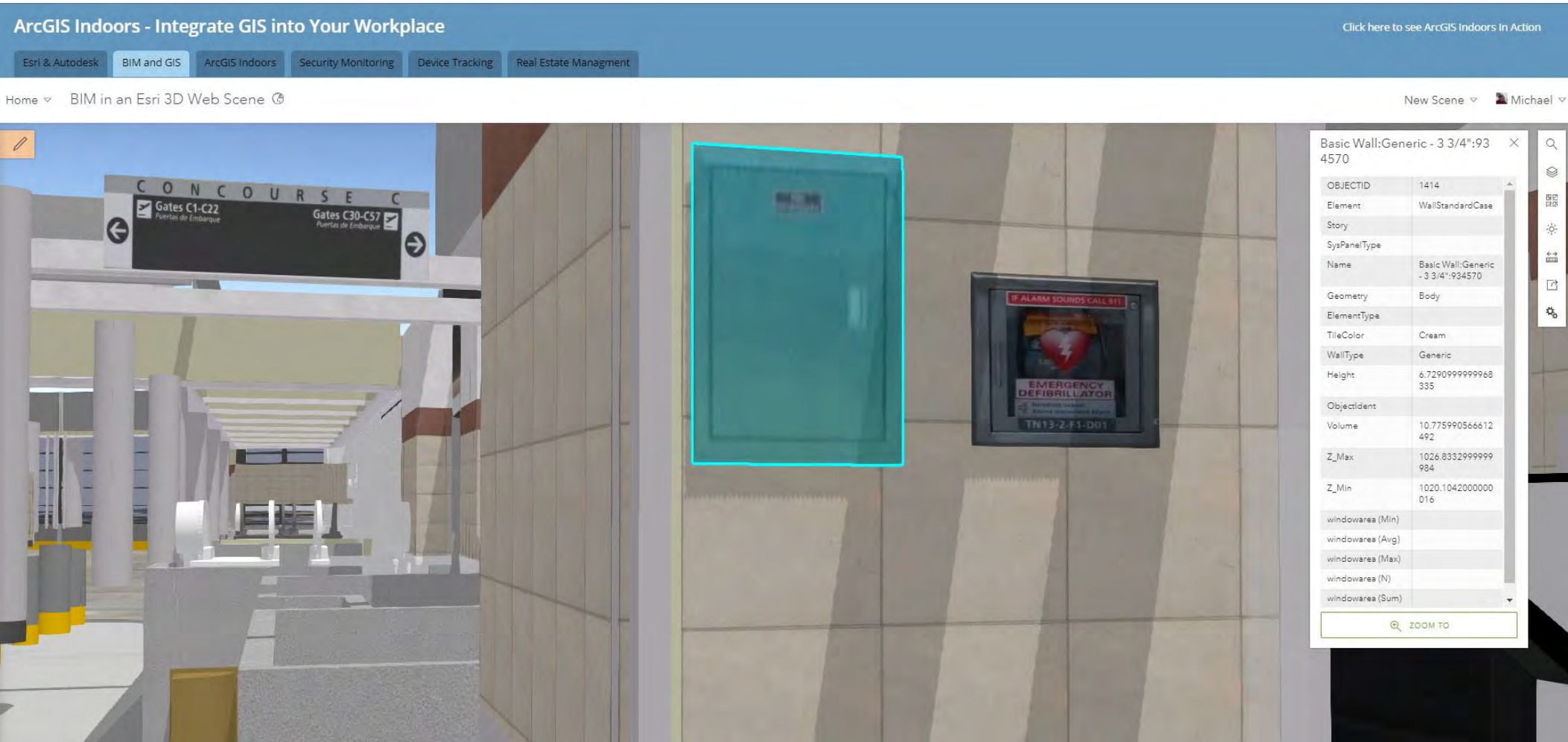
ArcGIS Pro Reads Directly Revit (.rvt)  
& Publishes to 3D Web Scene with Attributes

Courtesy of ATL &





# ESRI ArcGIS + Revit Interoperability



ArcGIS Pro Reads Directly Revit (.rvt)  
& Publishes to 3D Web Scene with Attributes

Courtesy of ATL &



# ESRI ArcGIS + Revit Interoperability



ArcGIS Pro Reads Directly from Revit  
& Publishes to 3D Web Scene with Attributes

Courtesy of ATL &





# EcoDomus (BIM-FM)

The screenshot displays the EcoDomus BIM-FM software interface. The central 3D view shows a complex network of blue and orange pipes and ducts within a building structure. A blue rectangular component is highlighted in the center. The left sidebar contains a 'DASHBOARD' and a 'File Management > Viewer' breadcrumb. Below this is a list of navigation items: Viewpoints, Asset Search, Affects, Systems, System Asset, Location Search, Room Data Sheet, Work Orders, Locations, Asset Data (with sub-items: Discipline, Architectural, Civil, Electrical, Fire Protection, Mechanical, Medical and Lab, Plumbing, Specialty, Components, Systems, Types, Spaces, Zones, Floors), File Management (with sub-items: BIM/CAD Files, Documents, Laser Scans), and Reports (with sub-items: GIS BIM Analytics, Work Orders). The top toolbar includes icons for navigation and editing. The right sidebar shows details for 'Asset - VAV 2-19' and 'Type - Single Duct Variable Air Volume T...'. The 'Asset' section includes a table of parameters and values. The 'Type' section includes a table of parameters and values. The 'Documents' section lists various system components.

**Asset - VAV 2-19**

Parameter	Value
Group: Identity Data	
Description	VAV 2-19
Spaces	2726A - Pharmacy...
Barcode	
Comments	
Edited by	
Mark	264
Model Number Des...	
PDF URL	
SerialNumber	
Symbol	VAV 2-19

**Type - Single Duct Variable Air Volume T...**

Parameter	Value
Group: Identity Data	
Description	
Assembly Code	
Assembly Description	
Code Name	
Replacement Cost	0.00
Description	
Edited by	
Keynote	
Manufacturer	Titus

**Documents**

**Systems**

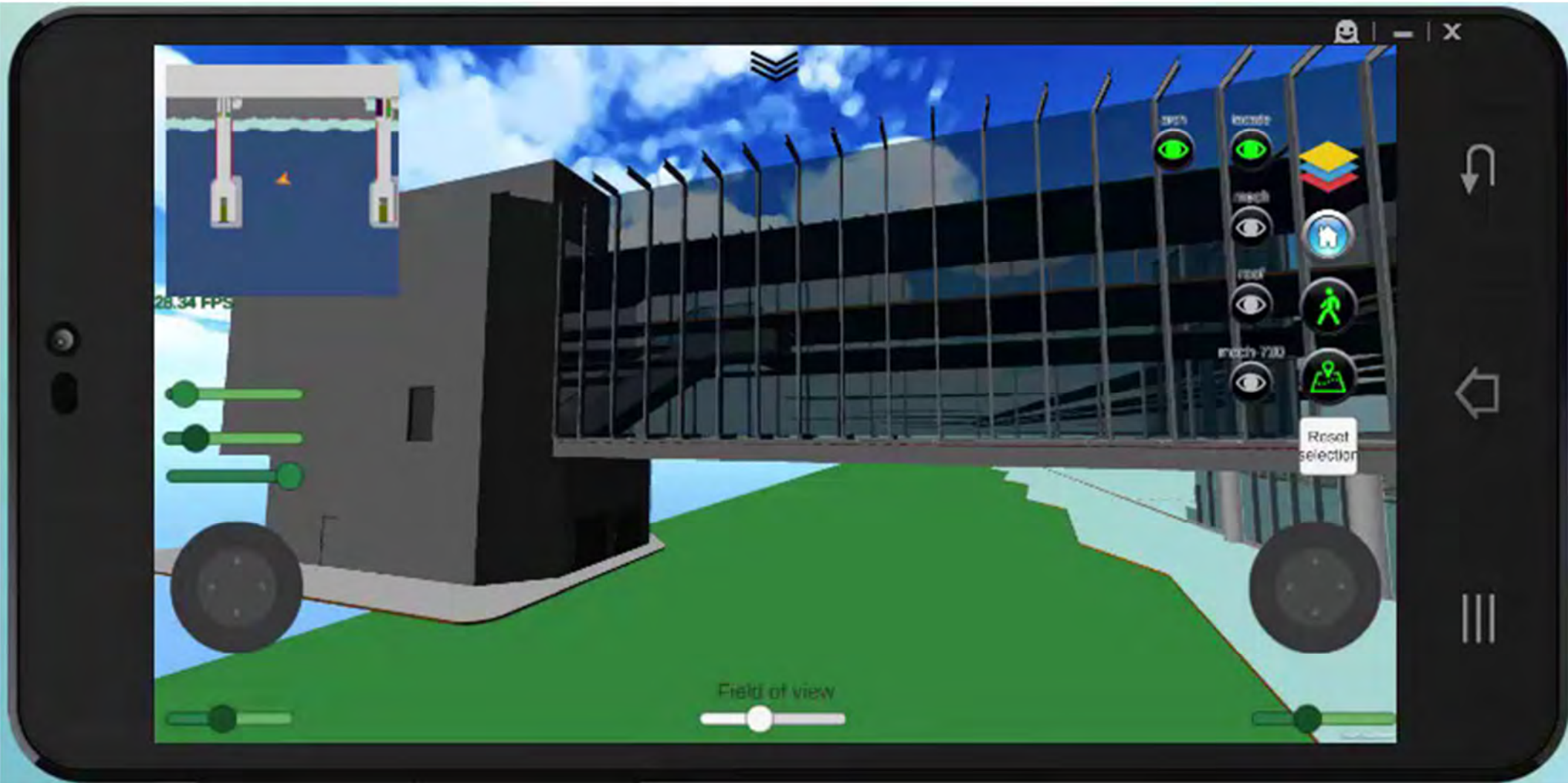
System

- HWR
- HWS
- SA-1 (3)
- SA-1 RTU-1 RTU-2
- SA-1 VAV 2-19

Composite BIM Models for FM

Courtesy of  
**ecodomus**

# EcoDomus (BIM-FM)

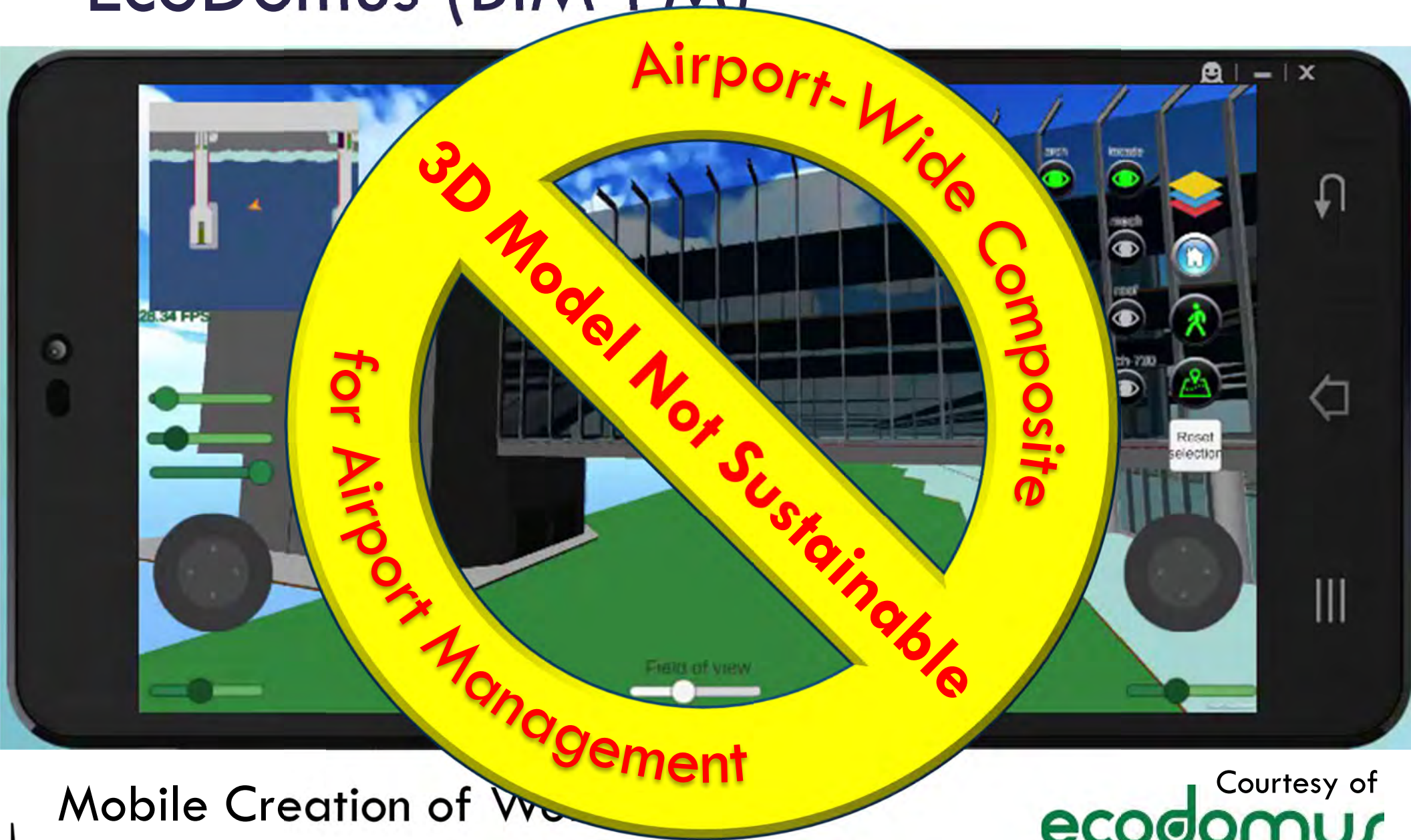


Mobile Creation of Work Orders  
During Field Inspections

Courtesy of  
**ecodomus**



# EcoDomus (BIM-FM)



Mobile Creation of View  
During Field Inspections

Courtesy of  
**ecodomus**

# Surveyed 3D (via LiDAR & Imagery)

EcoDomus PM FM Asana Salesforce w-post LiveJournal YahooMail Engadget Gazeta GoToMeeting LinkedIn Basecamp Exostar Money TimeZones Paychex Jigsaw

ecodomus

Igor Starkov - EcoDomus - System Admin Client: EcoDomus LOGOUT

DASHBOARD FM > File Management > Viewer

Hotlinks Add Mode: Off

**Viewpoints**

- Electrical
  - Lighting Fixture
- HVAC
  - Station 2
  - Boiler

**Asset Search**

**Impacts**

**Systems**

**System Asset**

**Location Search**

**Room Data Sheet**

**Work Orders**

**Locations**

Search Text

IFS Main Plant


Medical building

**Asset**

Parameter	Value
Group: Identity Data	
Name	AHU
Descripti...	Roof top unit
Asset Id...	
Barcode	1221
Conditio...	Good
Installati...	2014-07-16T00:00:00
Location	1XS2
Serial N...	S12231
Tag Nu...	

**Type**

Parameter	Value
Group: Identity Data	
Name	Air Handling Unit
Descripti...	
Manufac...	
Expecte...	
Model N...	
Part Nu...	



A 3D model of industrial equipment, likely an Air Handling Unit (AHU), is shown. The model is blue and cylindrical, with a red dot and label 'AHU' pointing to it. Below it, a red dot and label 'Tower Light 2' point to a horizontal pipe. The background shows a complex network of pipes and structural elements. A 'DANGER' sign is visible in the bottom left corner of the 3D view.

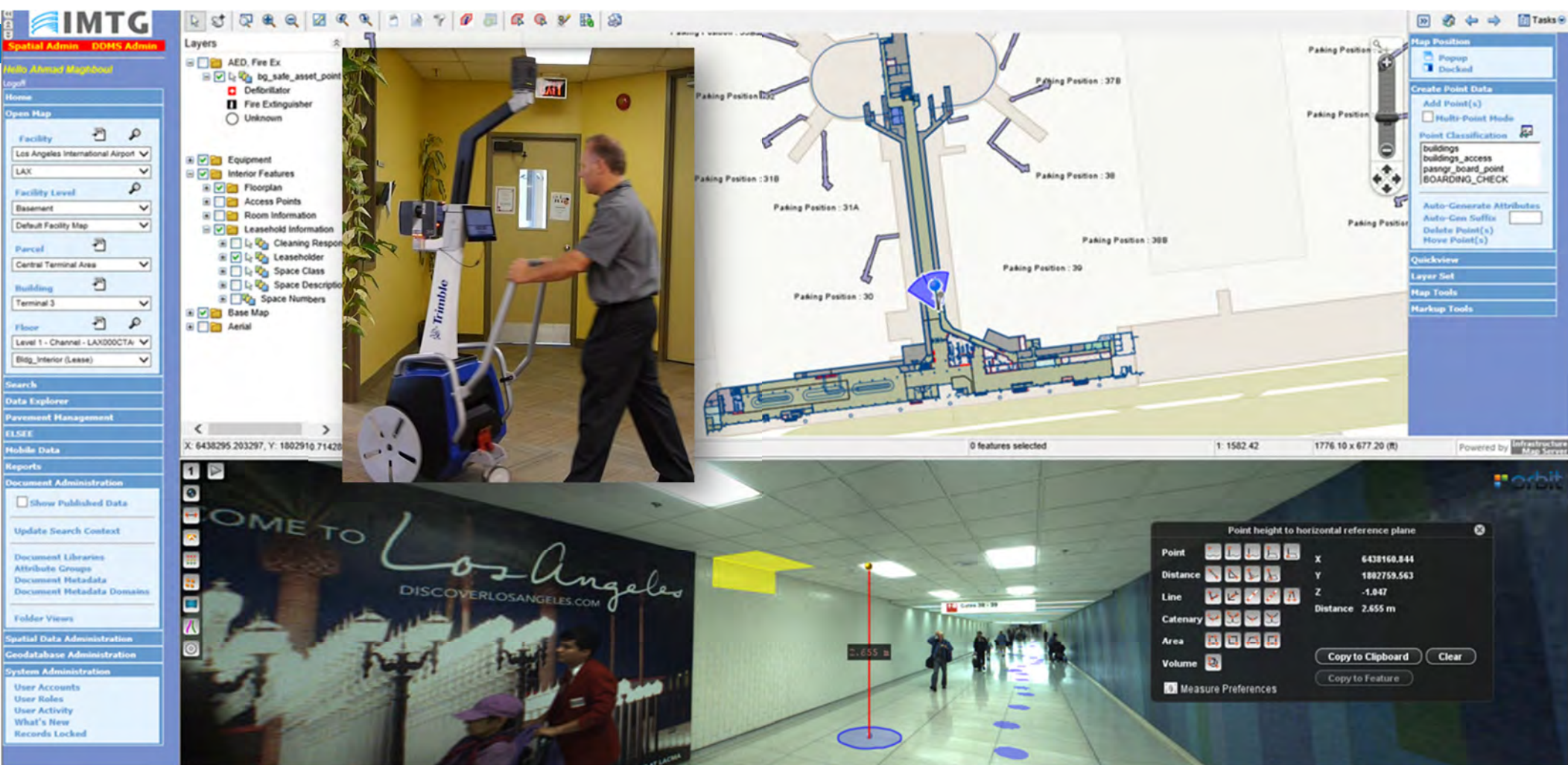
ScreenCast-O-Matic.com

BIM Models Combined with  
Laser Scanned / Photo Imagery

Courtesy of  
**ecodomus**



# Surveyed 3D (via LiDAR & Imagery)

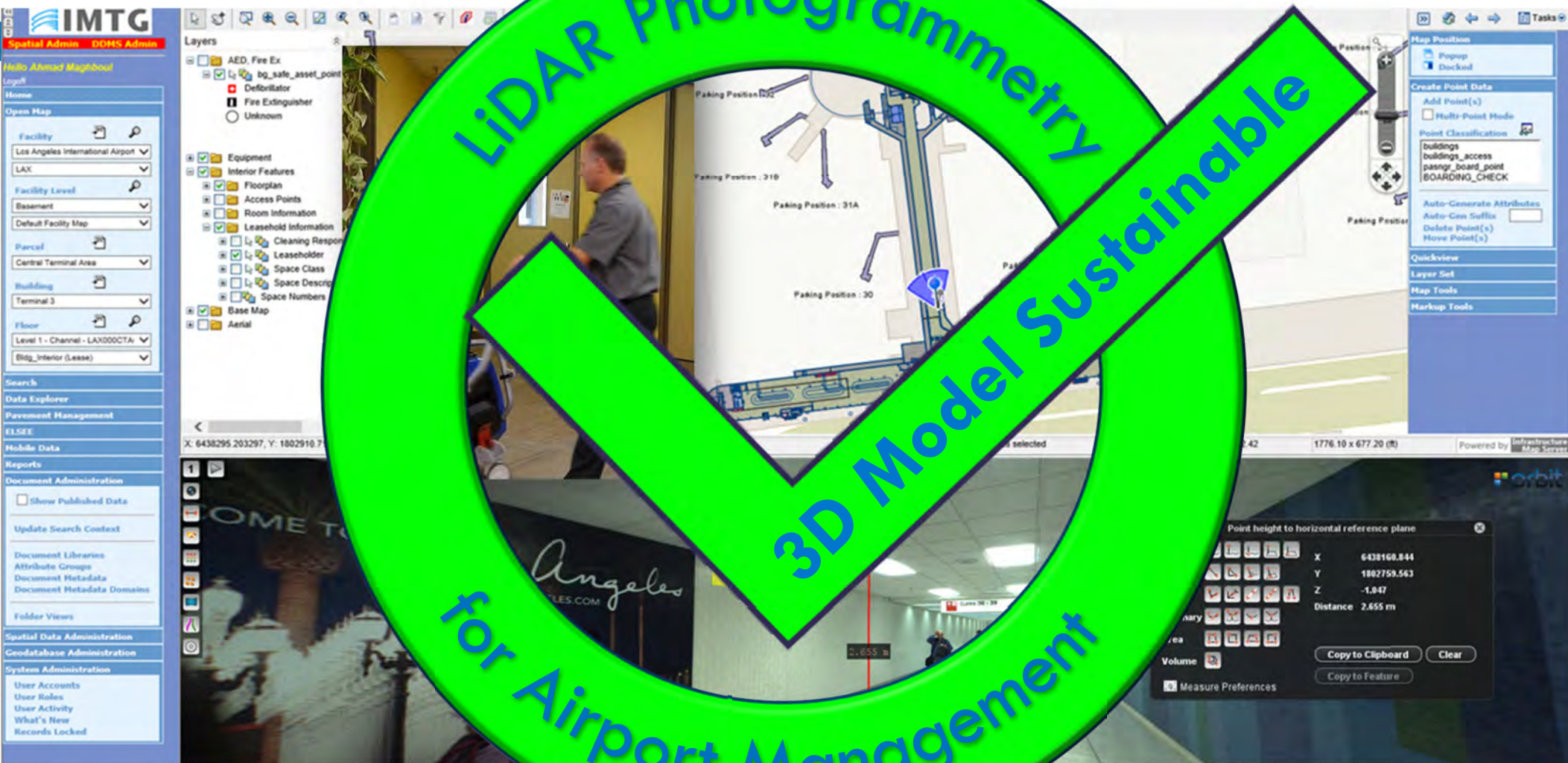


Leveraging Trimble LiDAR Cart  
& Orbit Software to Capture As-Built Data

Courtesy of LAX &  
**X-SPATIAL**



# Surveyed 3D (via LiDAR & Imagery)

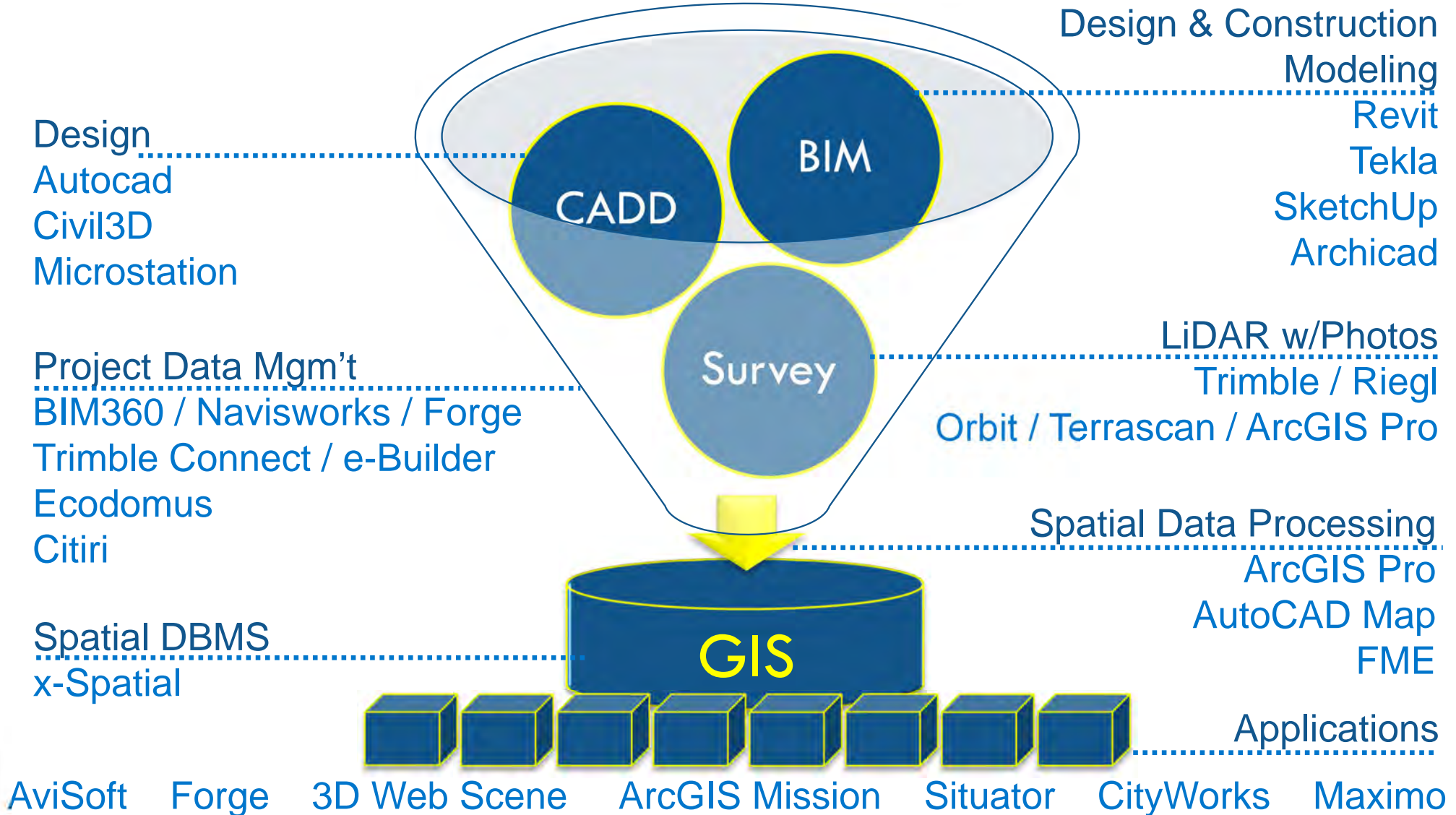


Leveraging Trimble LiDAR Scan  
& Orbit Software to Capture As-Built Data

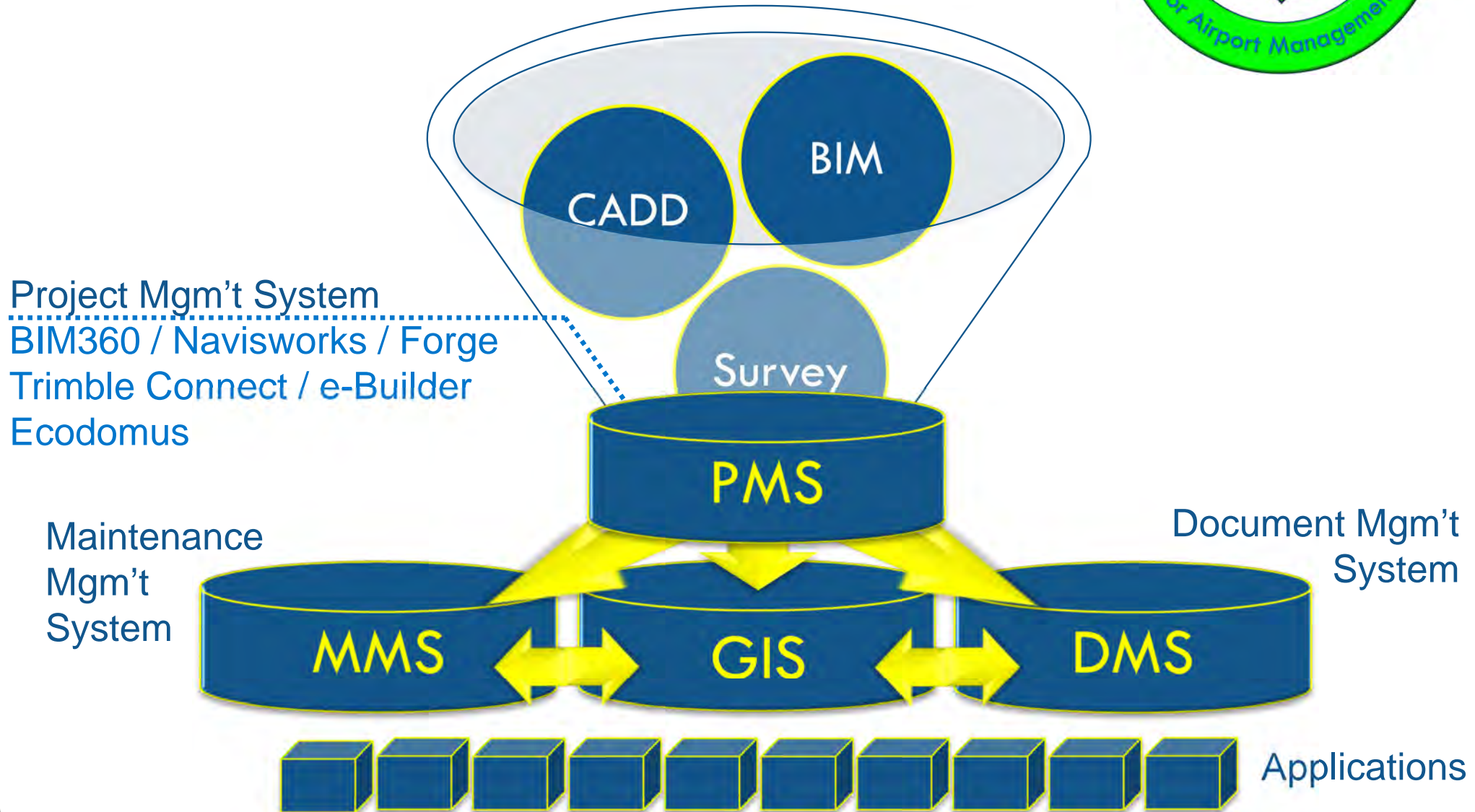
Courtesy of LAX &  
**X·SPATIAL**



# Recommended Approach

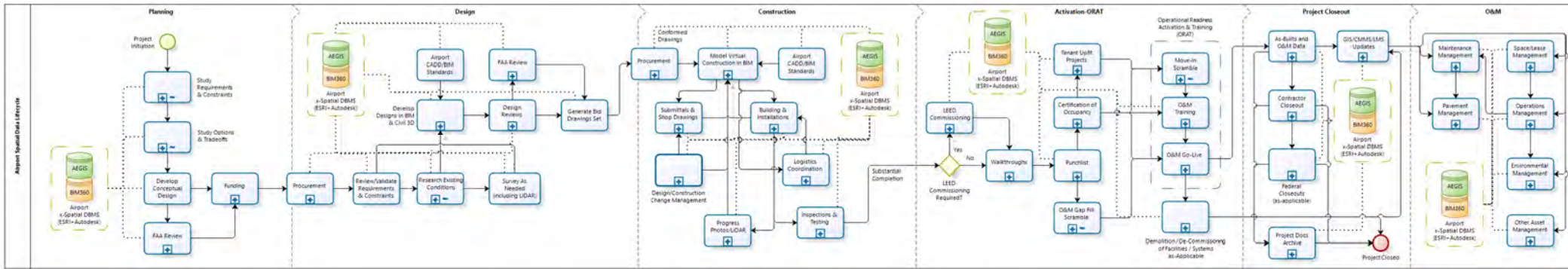


# Airport Owner Systems

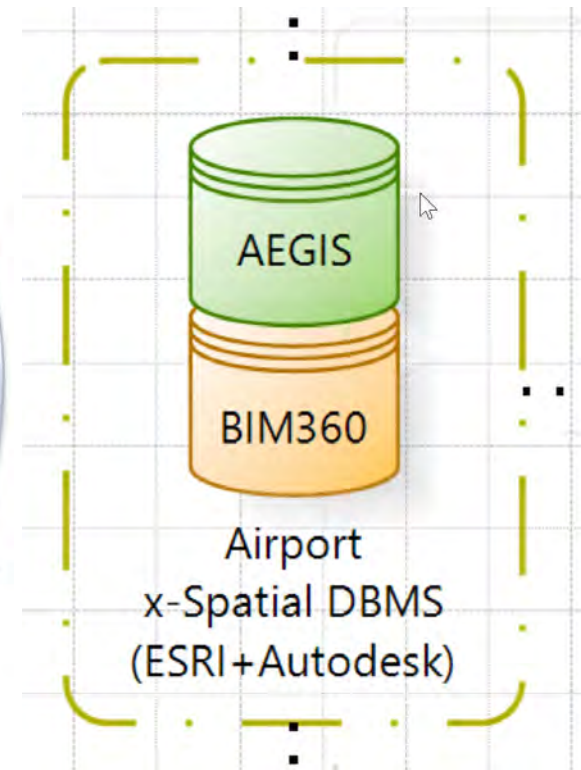
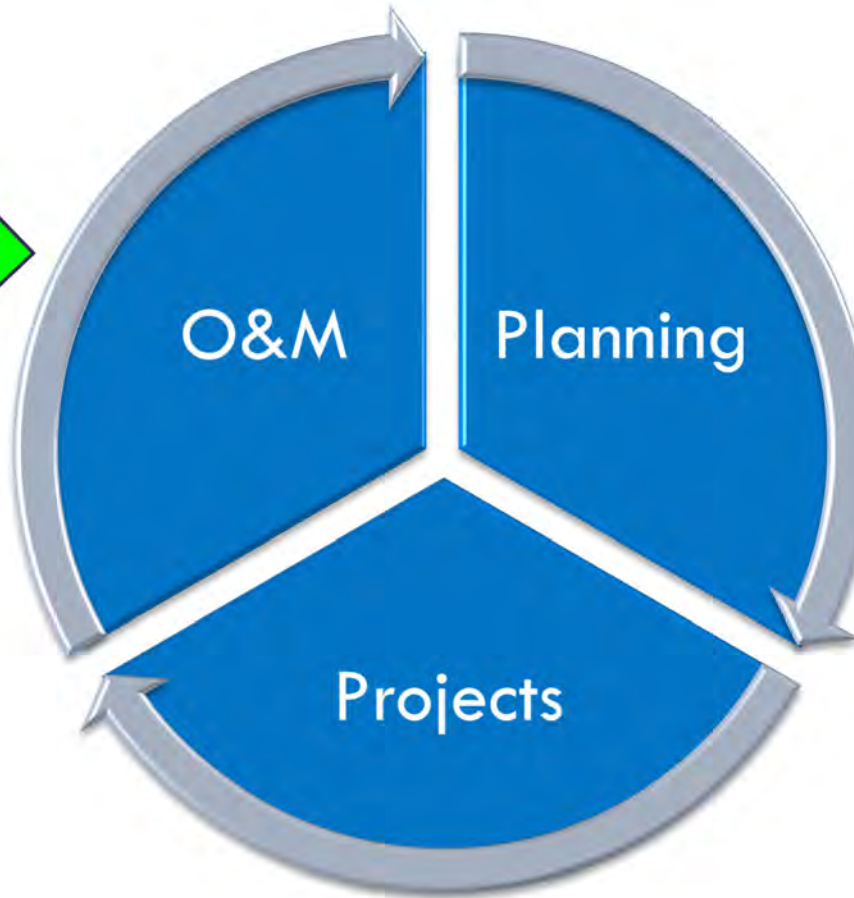




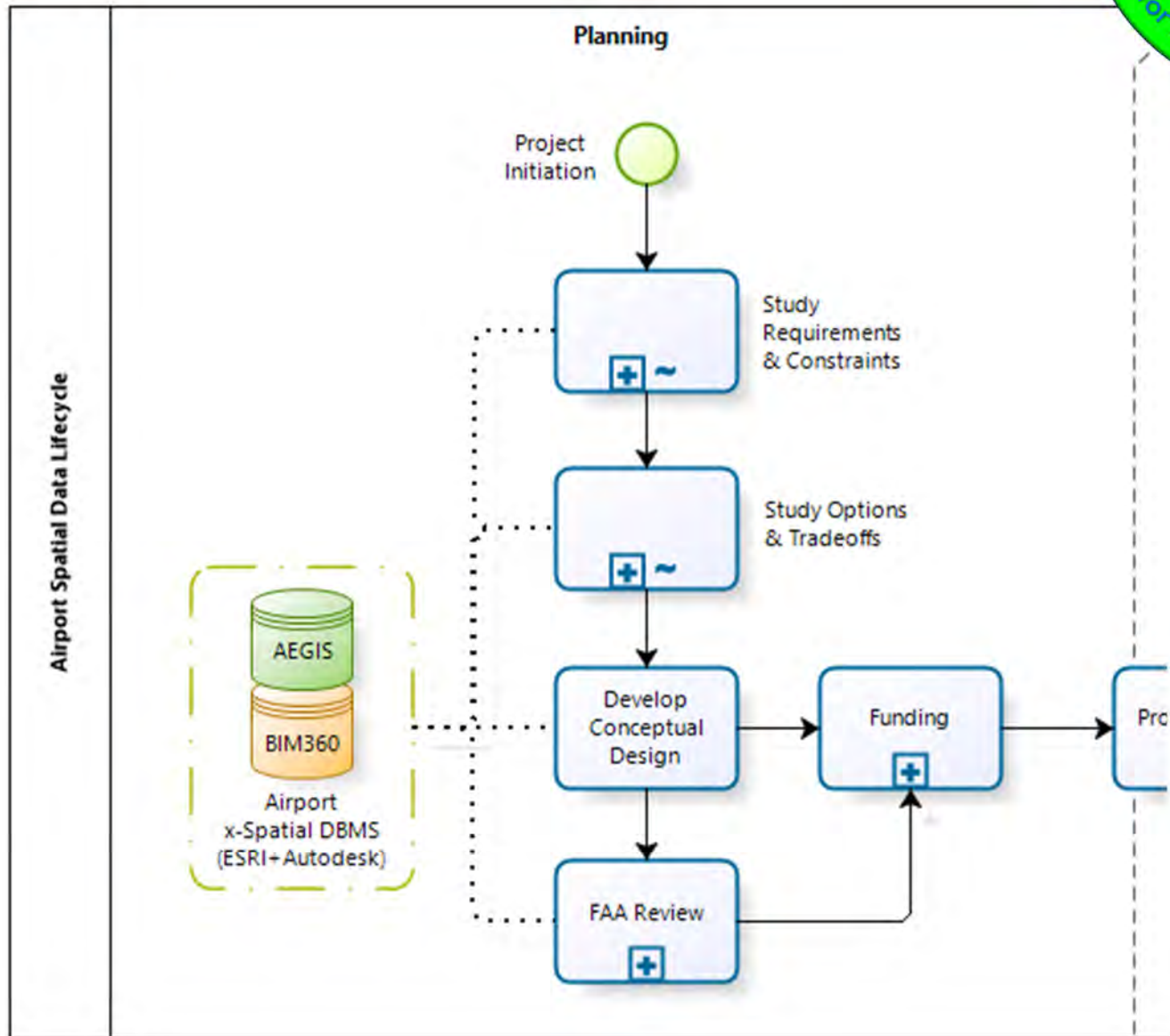
# Recommended Lifecycle Approach



Planning > Design > Construction > Activation > Closeout > O&M

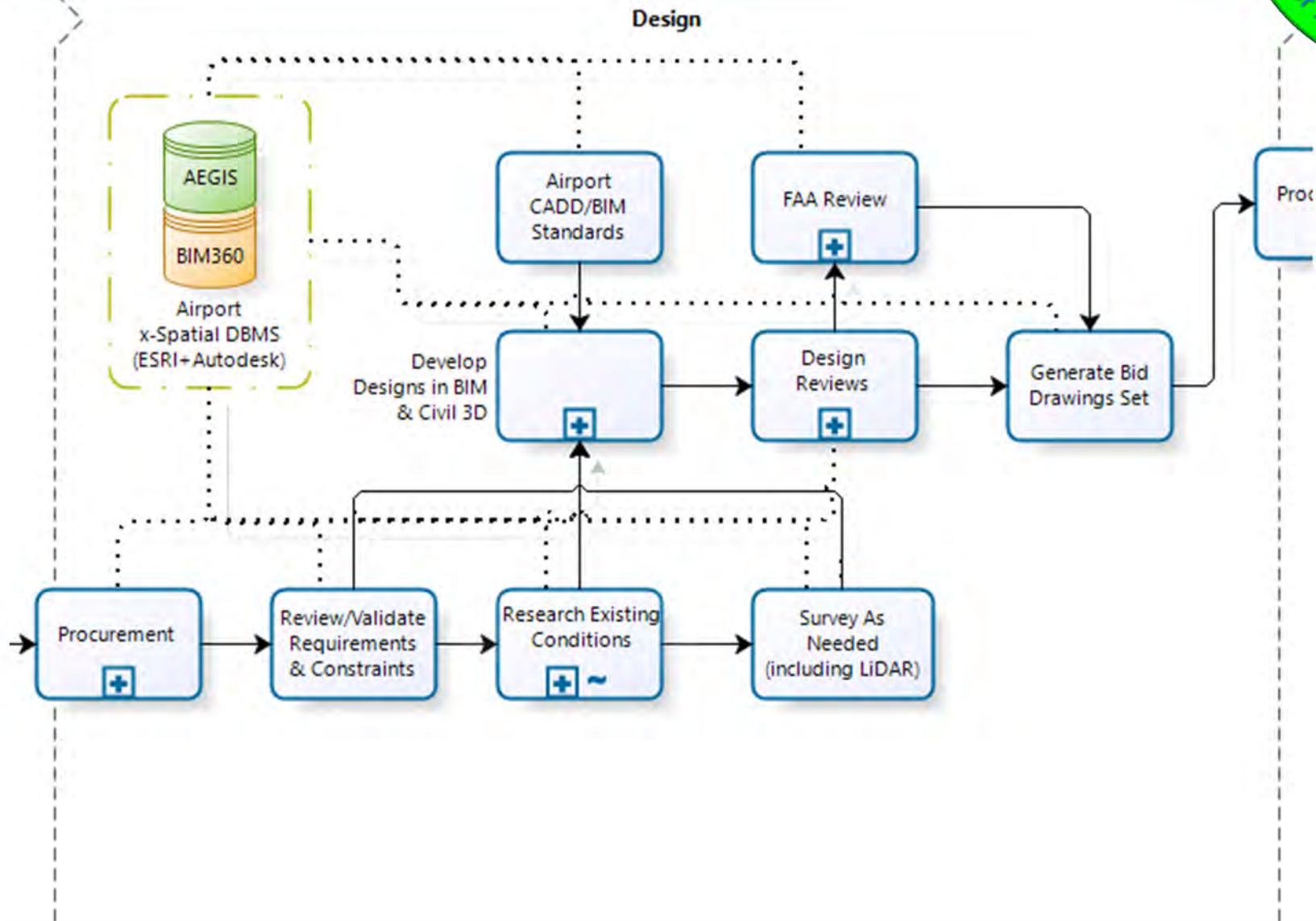


# Planning

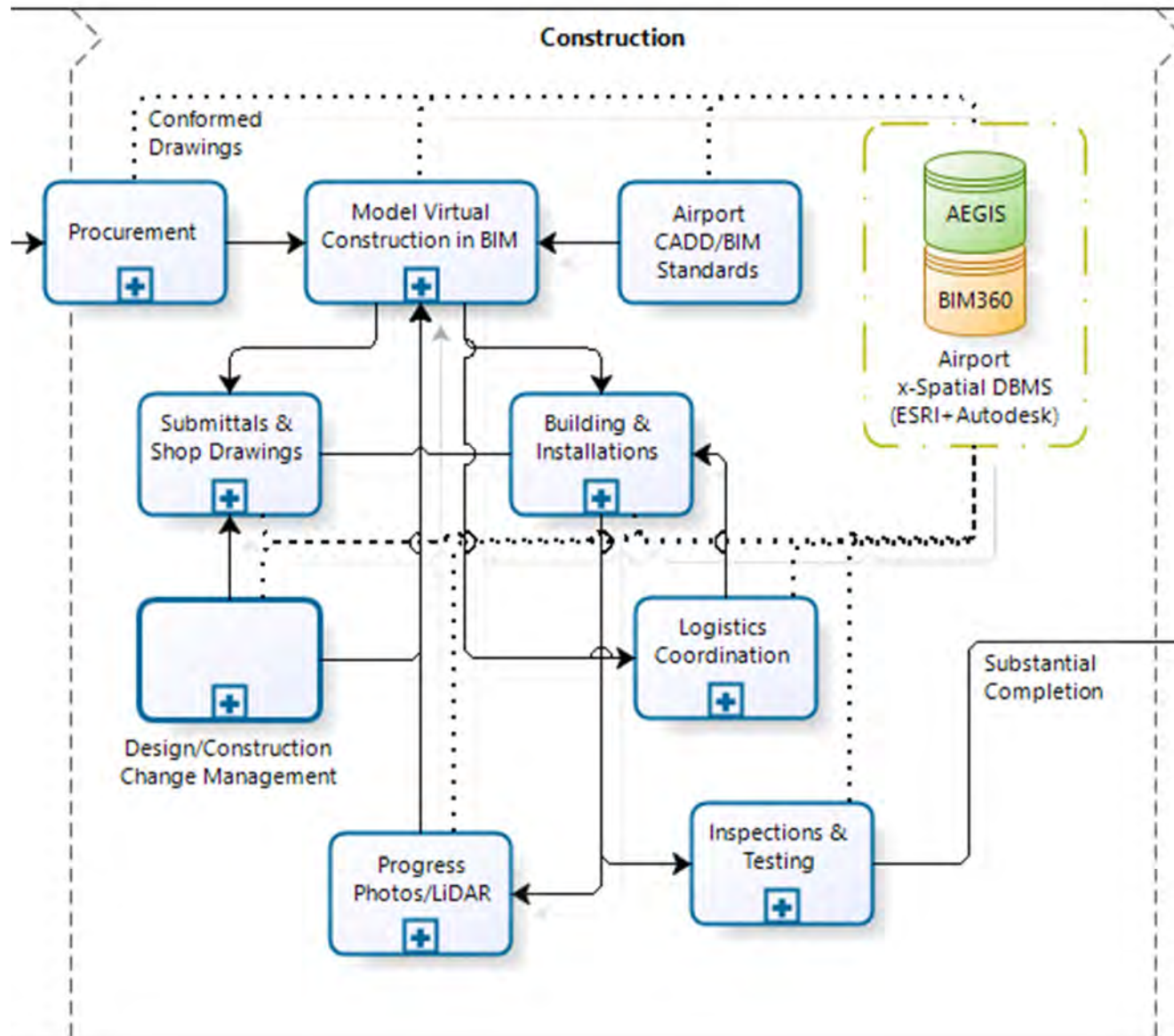




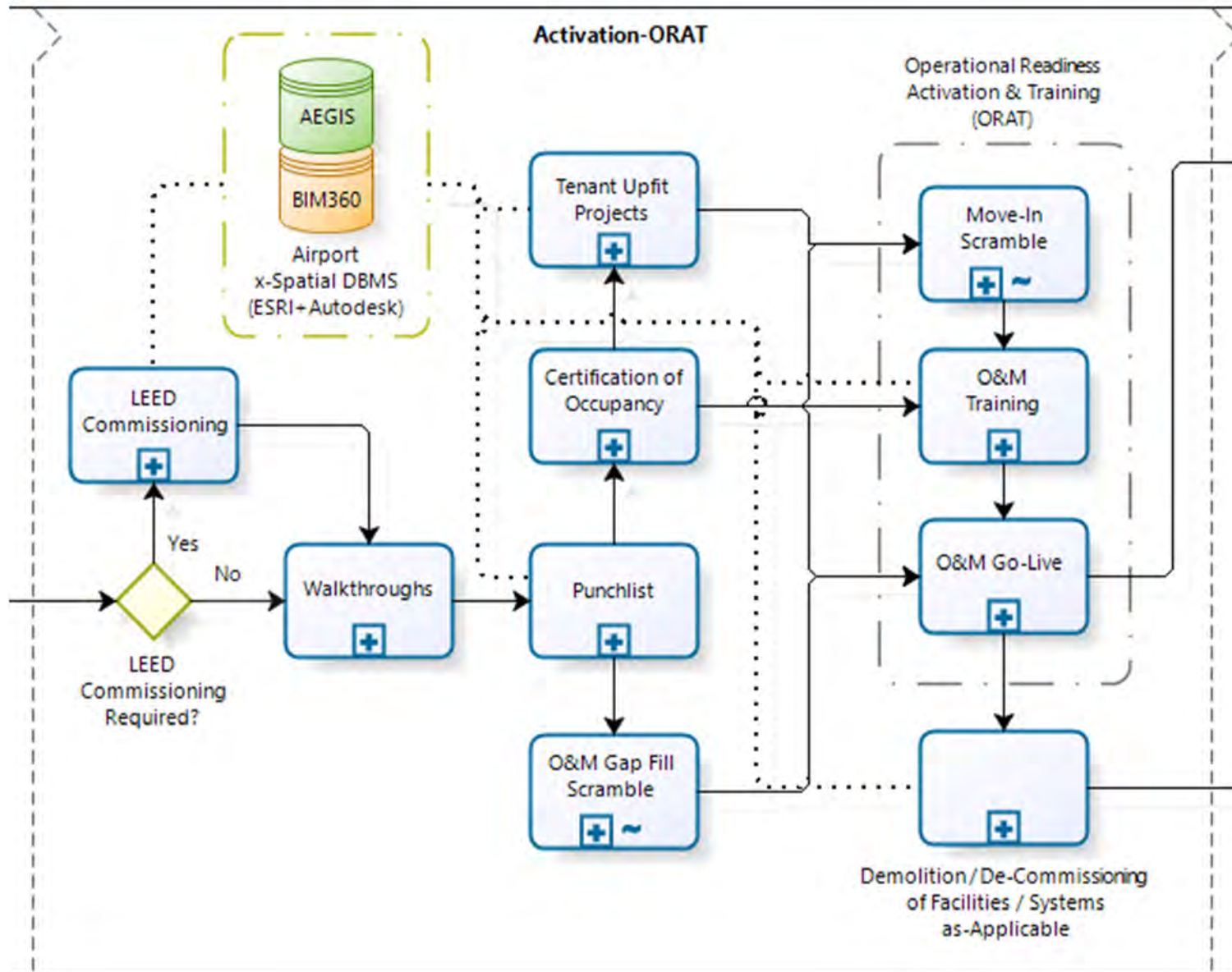
# Design



# Construction

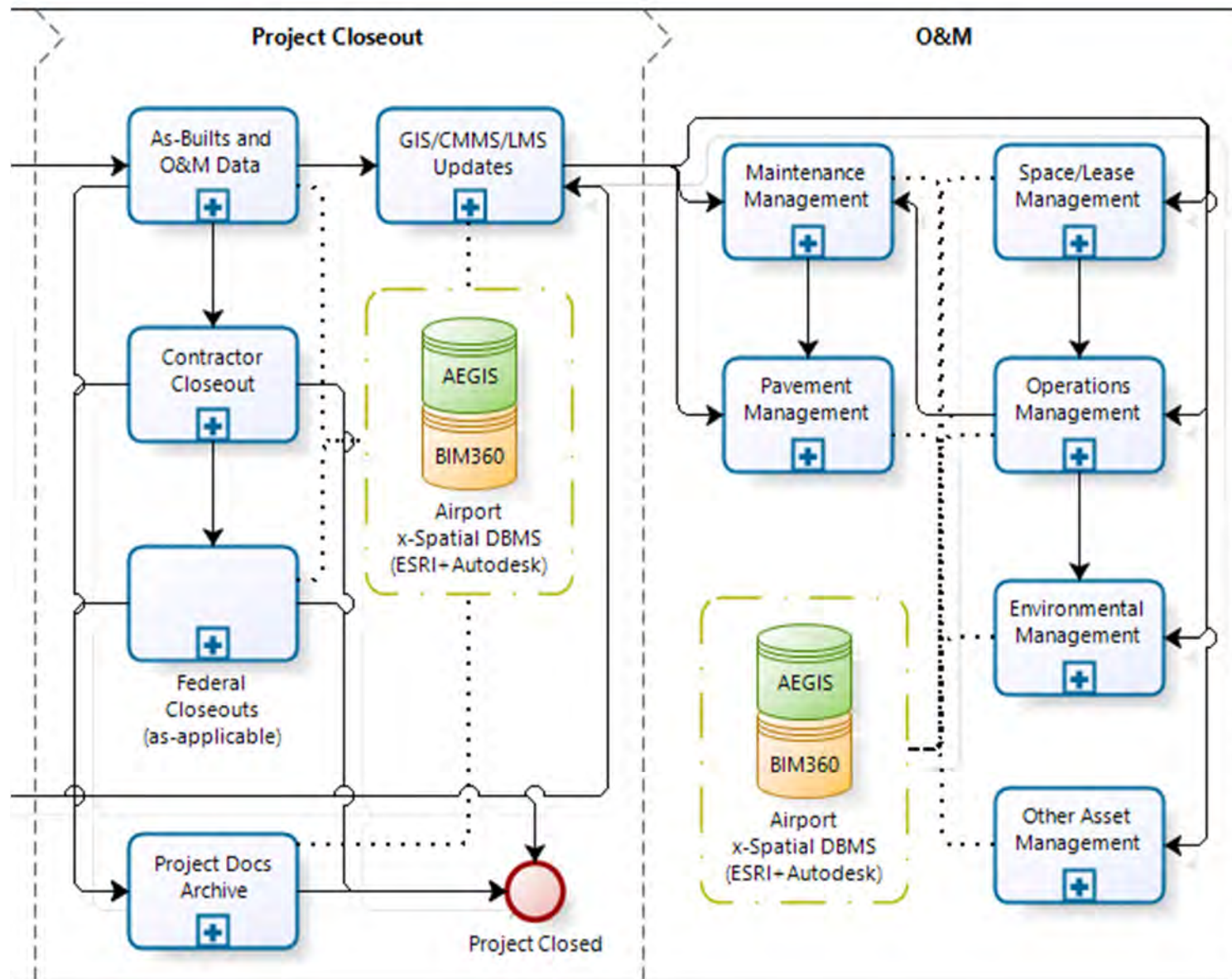


# Activation-ORAT





# Project Closeout & O&M



# Recommendations Summary

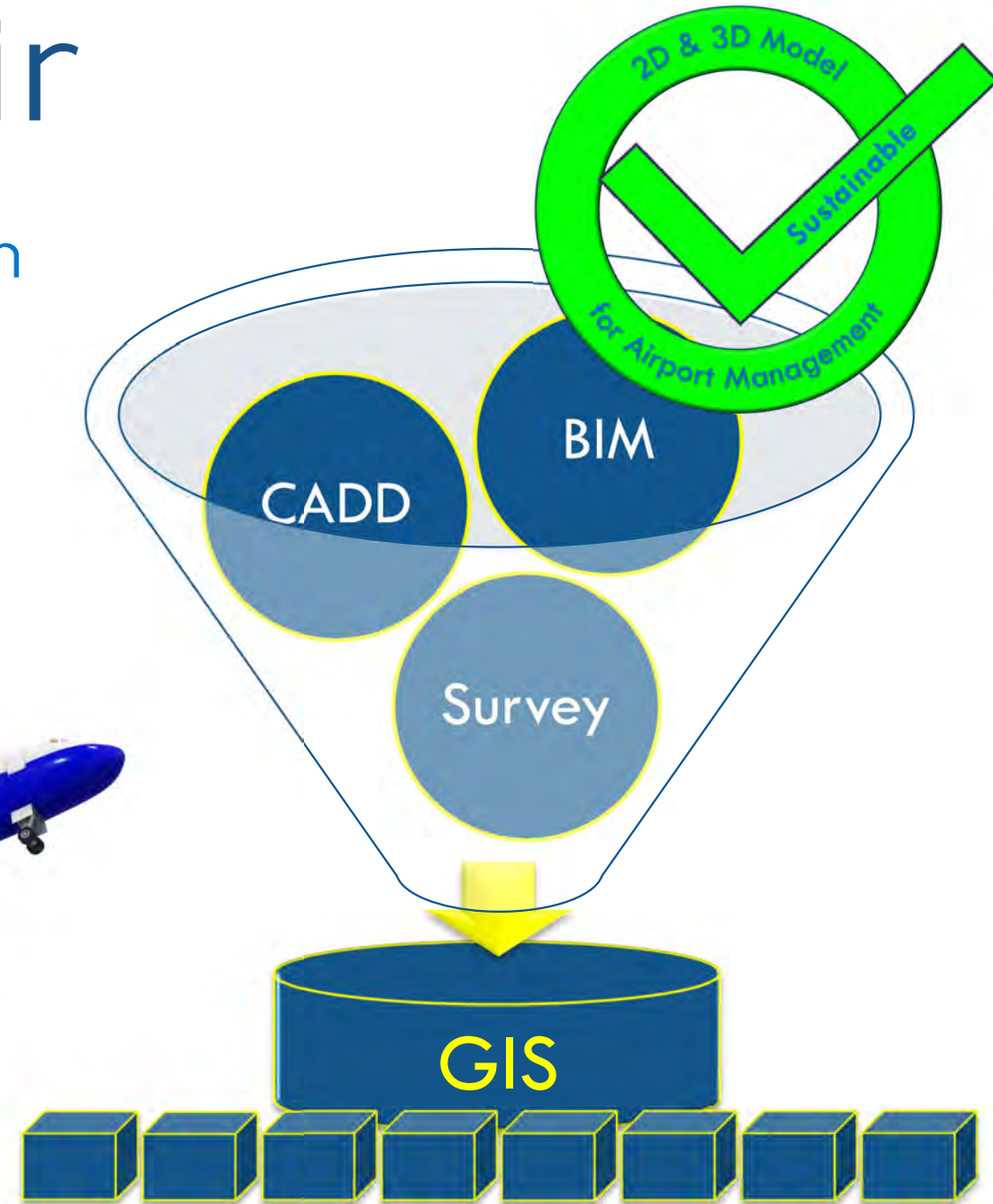


- ❑ Keep It Simple & Sustainable (KISS) Principle
- ❑ Setup/Maintain a Single Enterprise Geospatial Database Serving Needed 2D and 3D Composite Spatial Data
- ❑ Collect (for Reference) Construction Record Drawings, including BIM Deliverables, via Project/Construction Project Management System (PMS)
- ❑ Survey True-As-Built via Construction Photos with LiDAR
- ❑ Setup Survey Monument Network Throughout Your Facilities (Outdoors and Indoors) for LiDAR Update Scans

# David Tamir

David@TAMIRONICS.com

Tel. **+1.805.236.3286**



by David Tamir

**T.A.M.I.R.O.N.I.C.S**

Technology Applications Management with Intelligent Results

BIM vs GIS:

What Airport Owners Should Do ?