

# CitA

BIM GATHERING 2019



**4th CitA BIM Gathering** 26th September 2019, Galway, Ireland.

Delivering **better outcomes**  
for Irish Construction



# Trinity Business School: BIM to Digital Twin – The Journey

*Anand Mecheri, Invicara and Roger P. West, TCD*

Presented by Louise Kelly, Invicara







**Trinity Business School**



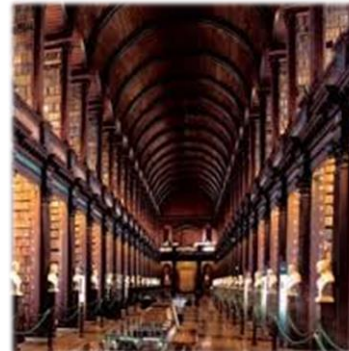
**E3 Learning Foundry**



**Dartry Student Rooms**



**Printing House Square**

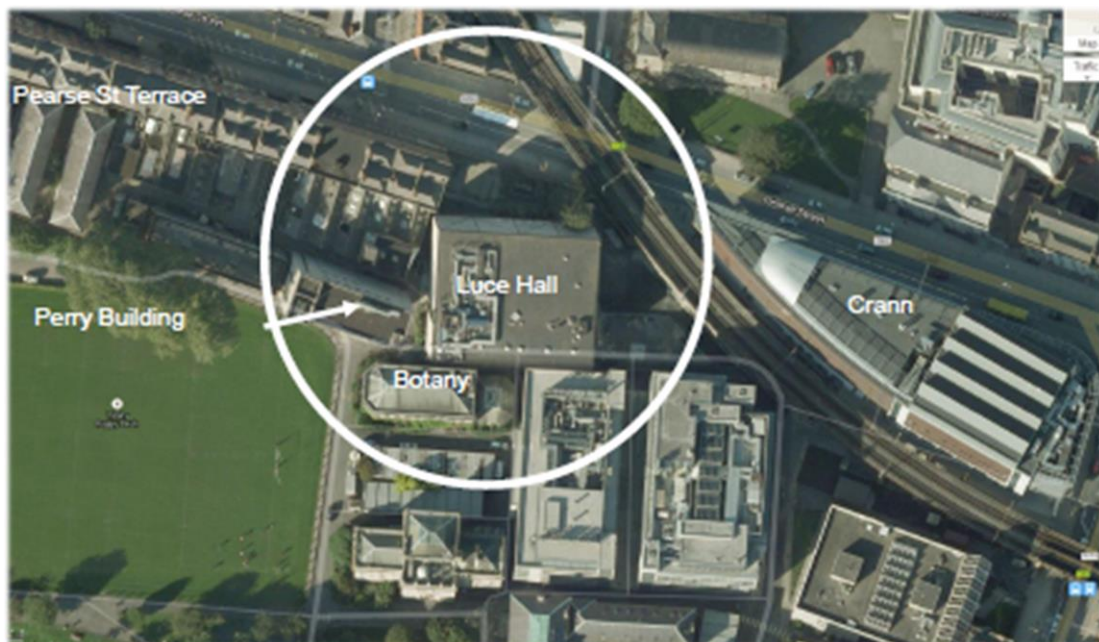


**Trinity Visitor Experience**



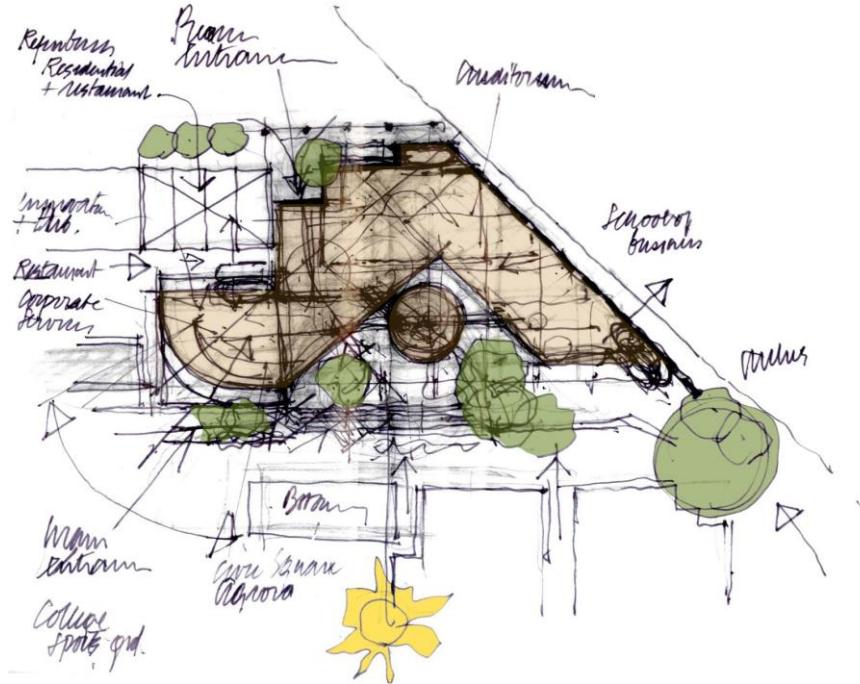
**Ttec at Grand Canal Dock**





**Six Storey | 14,000m<sup>2</sup> | €80m**





David Cahill, Scott Tallon Walker | Architects



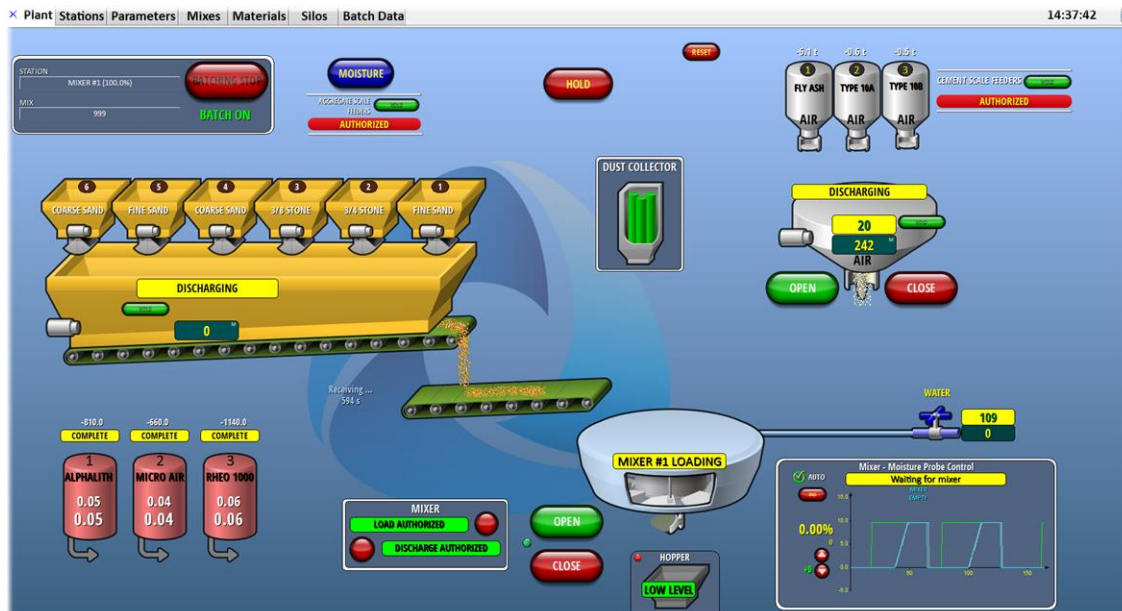
David Walshe, William O'Donnell | IN2 Engineering, M&E Engineers

## BMS and PoE from opening





# A DIGITAL TWIN



Concrete production



Flight simulation from “Sully” movie



## A DIGITAL TWIN

- A Digital Twin is a “realistic digital representation of assets, processes or systems in the built or natural environment”.

Bolton A, Enzer M, Schooling J et al. (2018) *‘The Gemini Principles: Guiding values for the national digital twin and information management framework’*

- Contains historical and real-time data allowing forecast of future states.
- Life-cycle phases from a digital platform: Supports concept development, design, construction and in-use data



Trinity Business School  
Pearse Street Entrance



# STATIC DIGITAL TWIN

## 01 Concept Phase:

- Planning
- Building mass optimisation
- Estimate construction and operational costs

## 02 Design Phase:

- Representation and visualisation
- Simulation
- Design optimisation
- Higher occupant comfort
- Lower capital and operational costs

## 03 Construction Phase:

- Work progress
- Earned value
- Site conditions
- Tracking of material, assets, people and plant,
- Visualise
- Promote collaboration,
- Accurate costs estimates



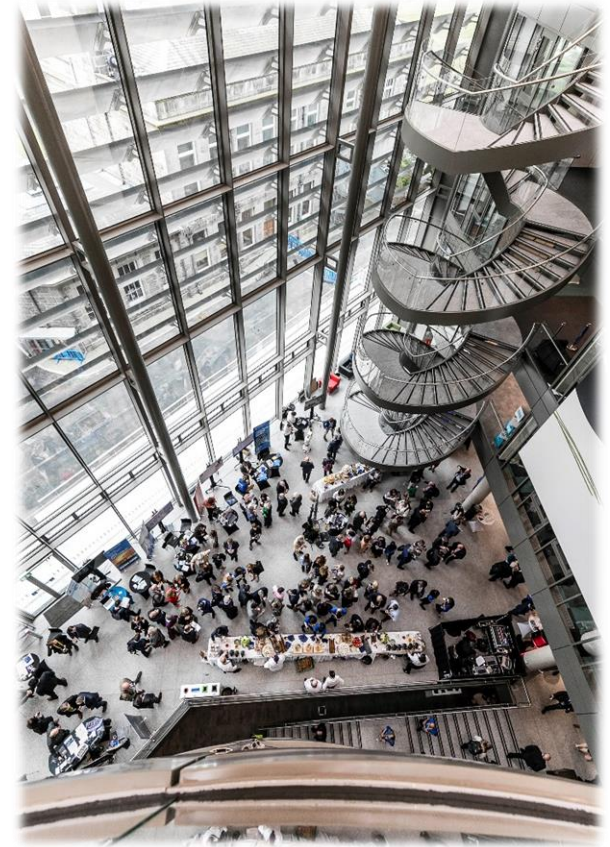




# STATIC DIGITAL TWIN

## 04 In-Use Stage:

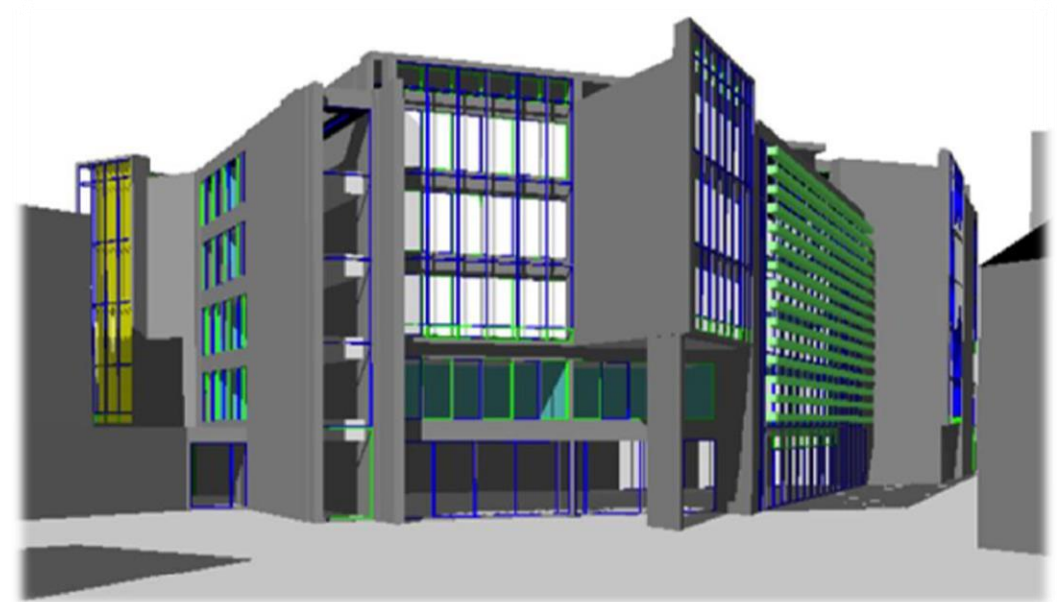
Digital building manual with as-built status, maintainable assets, Asset Information Model (AIM)





# DYNAMIC DIGITAL TWIN

- AIM reflects as-maintained condition
- Track building performance as-used vs as-built
- Energy demand, occupant comfort
- Space and asset utilisation
- Enable analytics to predict and optimise





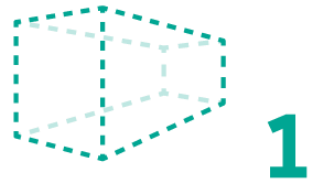


# 3D Models are **the seed** from which **Digital Twins** evolve.



## AGGREGATING ASSET INFORMATION

### DESIGN



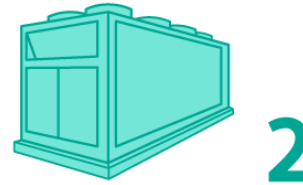
#### Design Data

Asset ID  
Uniclass  
Dimensions

#### Design Performance Data

Total Capacity  
EER  
Inlet Water Temp  
Outlet Water Temp

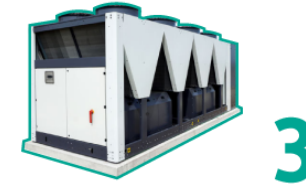
### CONSTRUCTION



#### Specifications Data

Model Number  
Manufacturer  
Description

### COMMISSIONING



#### Commissioning Data

Serial Number  
Commissioning Date  
Test Certificates





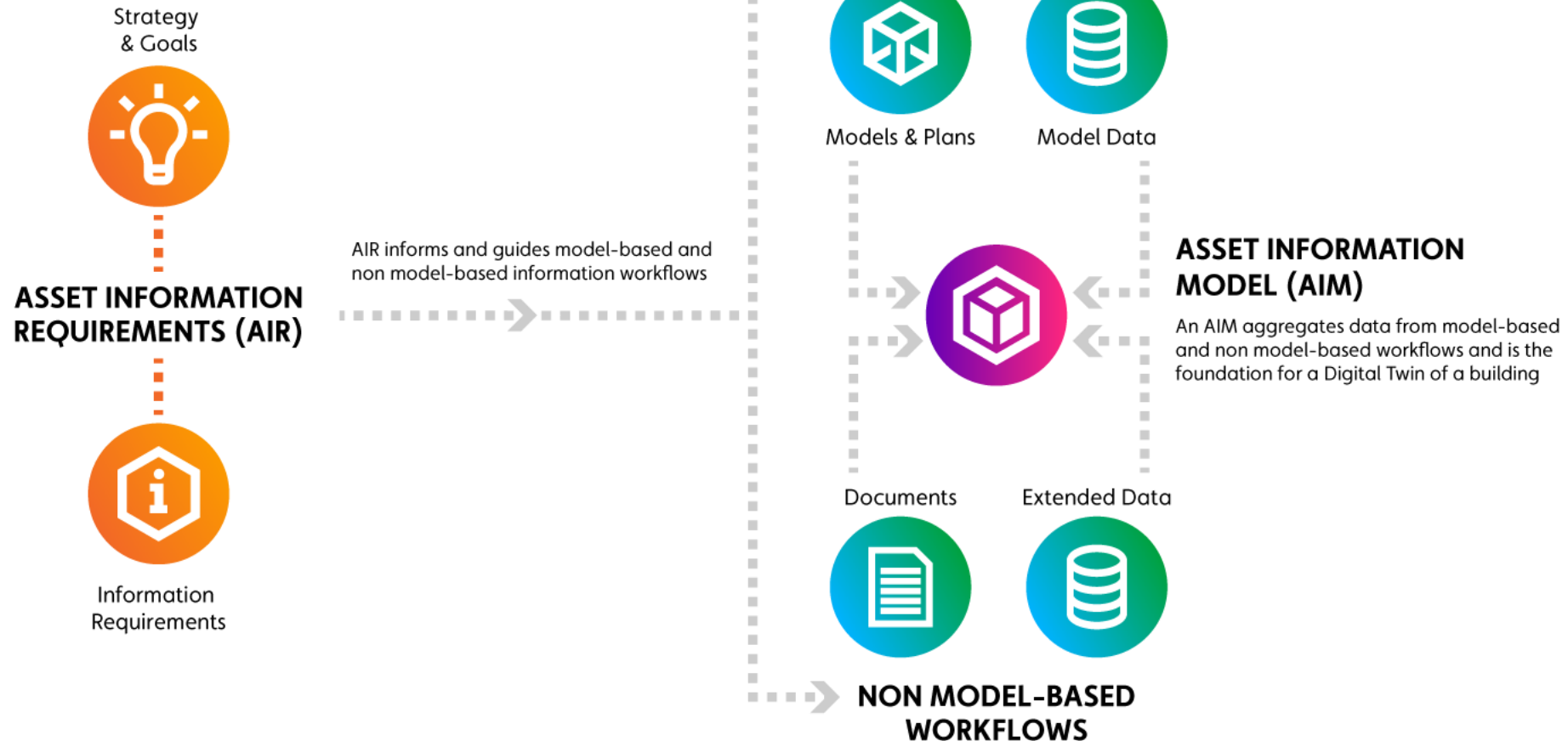
# WHAT IS AN ASSET INFORMATION MODEL(AIM)

**Information model relating to the operational phase**

*BS EN ISO 19650-1:2018*



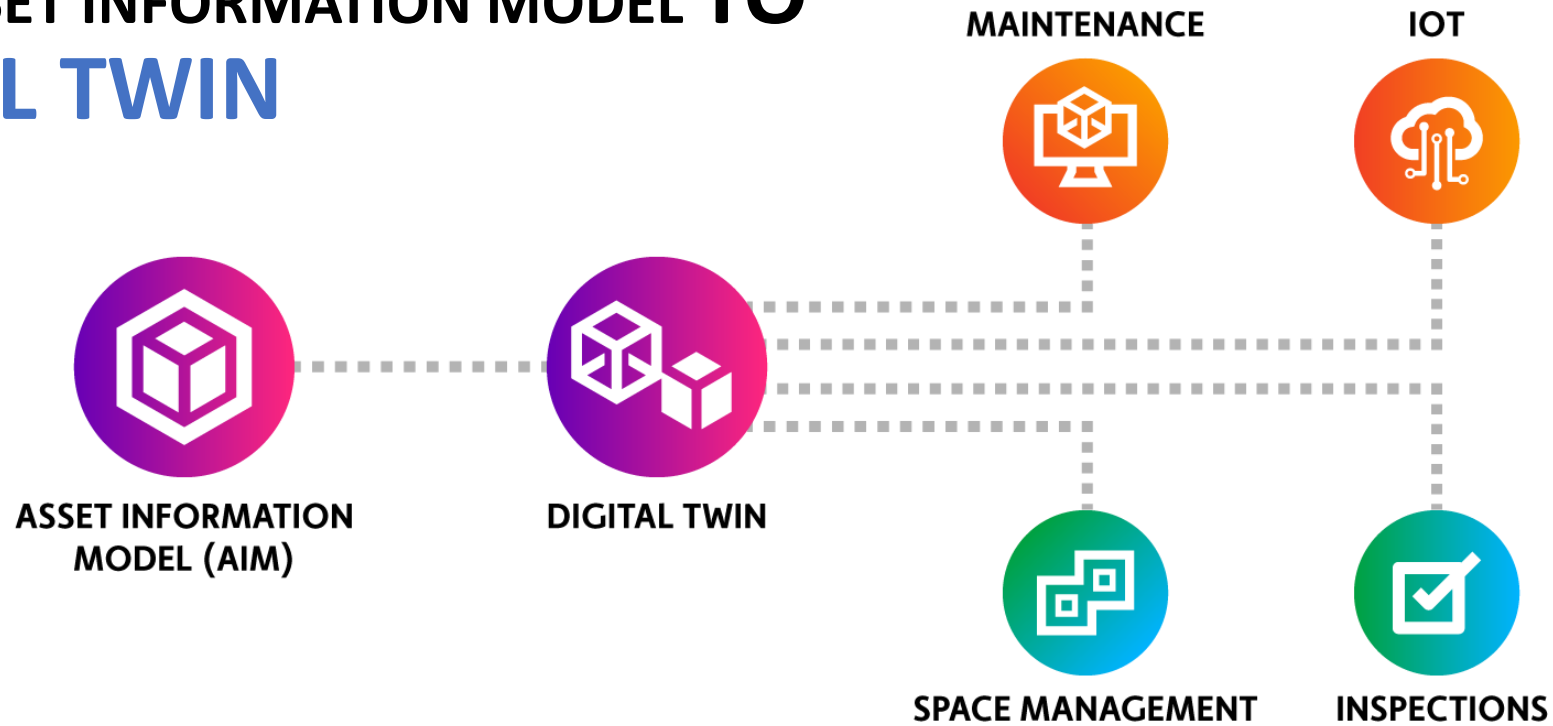
## PRODUCING AN ASSET INFORMATION MODEL







# FROM ASSET INFORMATION MODEL TO DIGITAL TWIN





## IN CONCLUSION

- **INFORMATION MANAGEMENT STRATEGY**
- **A FLEXIBLE AND EXTENSIBLE PLATFORM**
- **CONNECTED SYSTEMS**





# THANK YOU!

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