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#### INSTITUTION

The Hong Kong University of  
Science and Technology

#### PROJECT NAME

Integrating BIM and IoT for Facility  
Management

#### PROJECT LOCATION

The Hong Kong University of Science  
and Technology

#### TYPE

Operation and Maintenance

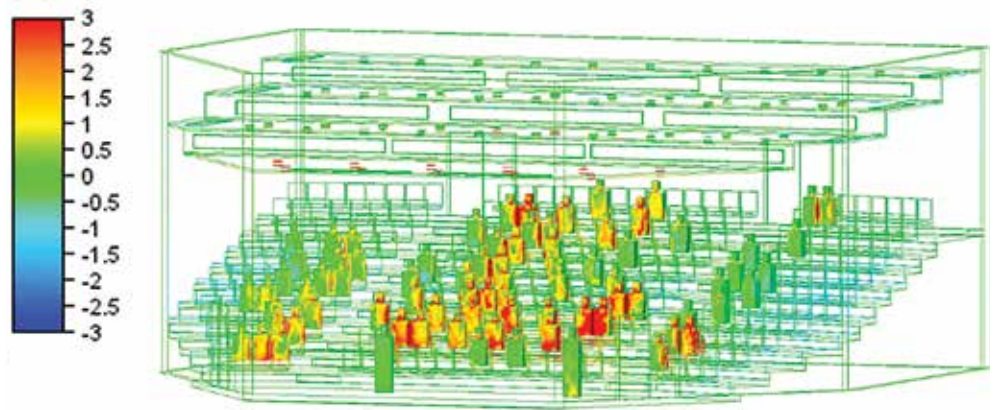
#### AUTODESK PRODUCTS USED

A360

CFD

Revit

(13) Predicted Mean Vote



Predicted Mean Vote Result from CFD  
Image courtesy of The Hong Kong University of Science and Technology

## Integrating BIM and IoT for Facility Management: Smart Facility Management for a Smarter Campus



LT-J BIM Model  
Image courtesy of The Hong Kong University of Science and Technology

### Project Background

Facility managers all over the world as they try to balance occupant comfort and energy consumption, where comfort and energy savings are often inversely related. Currently, they balance this trade-off by automating the building systems to maintain a constant temperature and maximized ventilation conditions during the day despite the space, function and usage of the facilities, and then power down during off-hours. While this makes some energy savings, it often leads to

an uncomfortable environment and wastage of energy. Instead, a more rigorous approach can be considered with the growth of Internet of Things infrastructure and Building Information Modelling technology.

### Project Challenges and Solutions

The Facility Management Office (FMO) at HKUST also faces the same dilemma of balancing energy usage and user comfort. Hence, keeping in line with the sustainable smart campus initiative at HKUST the project team have conducted this research to assess how BIM and IoT can be integrated to improve facility management on campus. The main idea is to leverage the complementary strengths of BIM and IoT technology and propose an advanced building automation system (BMS) for facility management (FM). In this project, two main improvements are proposed to the current BMS. Firstly, it includes a visualized building model that can easily retrieve instant sensor data from different systems in the building by using BIM. Secondly, it allows an automated decision-making process, which is derived from data-driven machine learning models, on HVAC system that could satisfy thermal comfort of occupants under minimised energy consumption.

### How does BIM help for your project?

By using BIM, it links the data to the reality. In this project, Revit was used to build a digital twin of LTJ in HKUST. Instead of looking at numbers in the traditional BMS, the visualized model can give the facility managers a better picture of the building they are managing. They can interact with the virtual model and get up-to-date information with the integration of data from IoT devices embedded in the building. BIM also gives a chance for new people to the industry or business people who are not professional facility managers to quickly pick up the information they want. On the other hand, BIM also helps to do the analysis. In this project, Autodesk CFD was used to conduct various simulations under different conditions. It quantitatively presents user thermal comfort. It also helps to save much more resource and time for doing on-site tests.