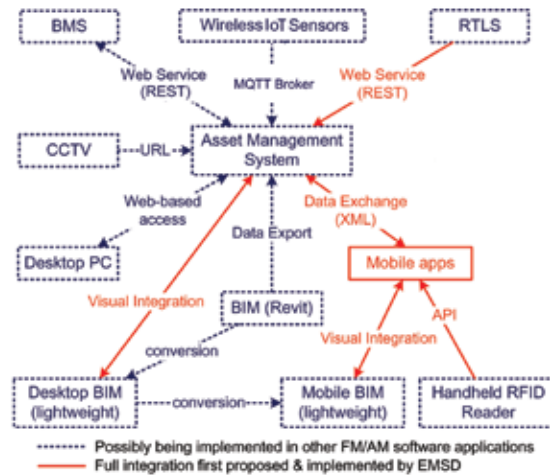




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Ir YUEN is currently an electronics engineer in BIM Sub-division at Electrical and Mechanical Services Department (EMSD). He joined the EMSD of the Government of HKSAR in 2012, and obtained his corporate membership of HKIE in Information Discipline in 2018. He is responsible for consultancy and project management services of electronic and IT systems, in particular the feasibility study, design and development of BIM - asset management (BIM-AM) system and formulating the EMSD BIM-AM Standards and Guidelines.

Ir YUEN and his team members received the Certificate of Merit in "The HKIE Innovation Awards for Young Members 2016 - An Invention" and the Honourable Mention in the "Autodesk Hong Kong BIM Awards 2016". He also co-authored a technical paper relating to BIM-AM that was published in IEEE CASE 2016. He was one the inventors of the Hong Kong patent for the EMSD BIM-AM System granted in 2017.



The novel framework for BIM-AM System  
Image courtesy of Electrical and Mechanical Services Department, HKSAR Government

# Smart BIM-AM Journey

## Reasons of the Innovation:

BIM is being increasingly adopted for buildings design and construction to facilitate coordination works, however, there are a few studies of its application in the long lifecycle of buildings operation and maintenance (O&M). Albeit that there are researches involving information exchange between BIM and facility management / asset management system with Building Management System or Radio Frequency Identification integrated, they are in essence not considered as full and seamless integration among BIM, facility management / asset management software and multiple O&M related systems in terms of their integration diversity and extent.

## Concept of the Innovation:

An integrated BIM-AM System which enables visual cross-reference from real-world objects to BIM model and even to their asset attributes, maintenance history, O&M manuals, asset relationships, live views of Closed Circuit Television (CCTV) system, real-time data from Building Management System (BMS), wireless Internet of Things (IoT) sensors as well

as location information from a Real Time Location System (RTLS) on one single integrated mobile platform with the aid of Radio Frequency Identification (RFID) scanning technology has been developed.

## Challenges:

During the implementation of the BIM-AM System, two key challenges were encountered. The first key challenge to overcome was data interoperability. When data from different software programs (e.g. BIM model, BMS, IoT sensors, AM system, work order management system) were exchanged and presented in the same platform, an effective process had to be established to extract, store, exchange, and associate the data to ensure interoperability. At the same time, specifications for information exchange defining communication and data protocols among systems had to be developed to enable effective interoperability.

The second key challenge to overcome was asset information requirements for MEP systems. A set of specification defining major asset types, general attributes, specific attributes, and naming conventions had to be developed since

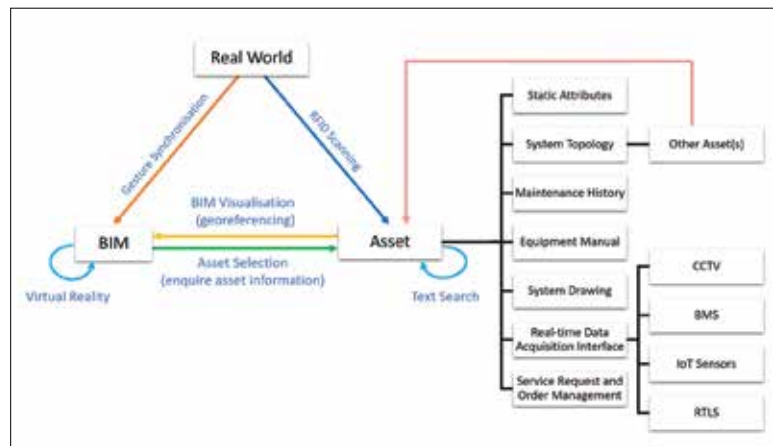


Transformation from BIM to BIM-AM  
Image courtesy of Electrical and Mechanical Services Department, HKSAR Government

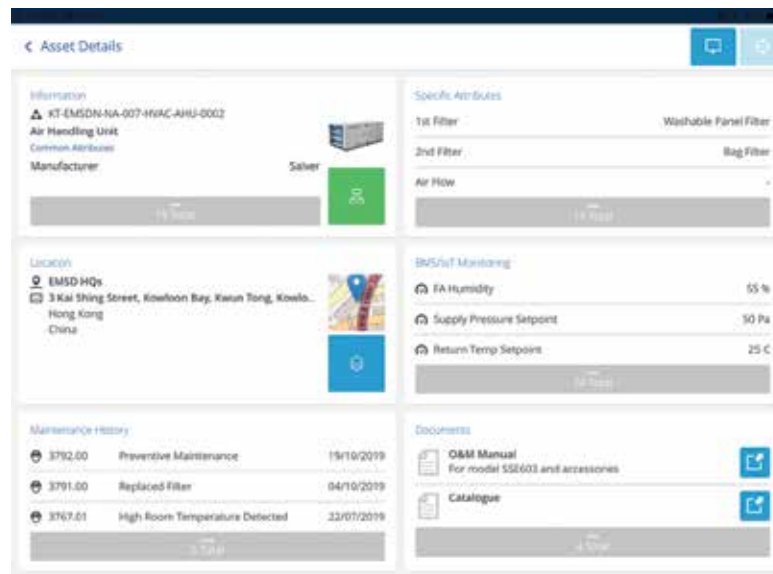
most of the existing BIM standards or guidelines focus on the Level of Development of a BIM object at different phases. While there are general requirements on the Level of Information of a BIM object at different phases, no comprehensive asset information requirement per equipment type could be found in the available BIM standards and guidelines at the time when the BIM-AM System was developed.

### Outcomes and Sustainable Development:

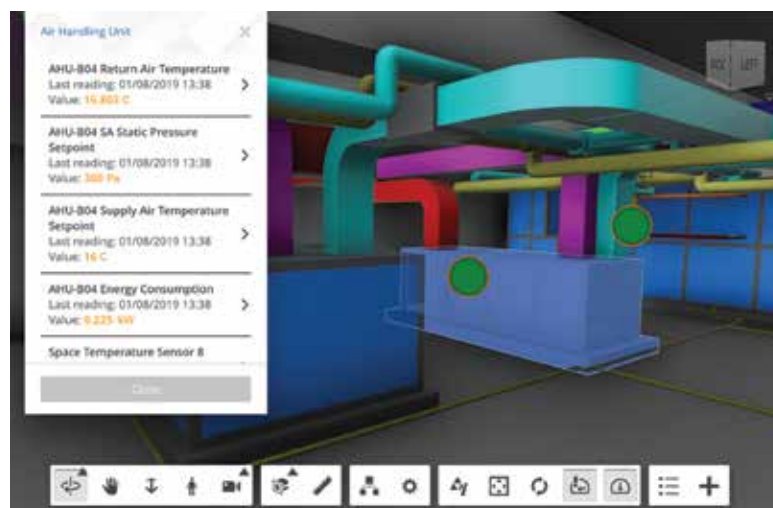
The project team have proved the novelty, originality, capability and potential towards smart O&M of the BIM-AM System through implementation at various venues and an 8-year Hong Kong patent of the BIM-AM System was granted in 2017. The BIM-AM System features multiple O&M tools in a single integrated application, offering real-time O&M information sharing and exchange capabilities, thus making system handover and O&M much more efficient and effective. Currently, they are further enhancing the BIM-AM System as well as the EMSD BIM-AM Standards and Guidelines after trial in some pilot projects.



A graphical summary of BIM-AM System features  
Image courtesy of Electrical and Mechanical Services Department, HKSAR Government



Asset Details of an AHU  
Image courtesy of Electrical and Mechanical Services Department, HKSAR Government



BMS point status overlay for monitoring a chiller plant room  
Image courtesy of Electrical and Mechanical Services Department, HKSAR Government