

# Smart Space Management Transforms Lingnan University Library

Empowering a Fairer, Efficient and Insightful Library Experience with Real-Time IoT

2025 Impact Awards Winner Case

Hong Kong, China

## Applications

Occupancy, People Counting, Indoor Air Quality Monitoring, Infrastructure Management

## Numbers of Devices Deployed

UG65 × 68 / VS135 × 27 / VS133 × 6 / VS121 × 92 / VS351 × 18 / VS341 × 7 / AM103 × 18 / AM308 × 19 / WS301 × 26 / EM300-ZLD × 3 / EM300-MLD × 7

## Location

Hong Kong, China

## Background

In response to a growing student population, Lingnan University Library (Hong Kong) faced increasing pressure to provide adequate study spaces. Seat ghosting—where students “reserve” seats by leaving personal items unattended—resulted in inefficient space utilization and significant management challenges.



## Challenges



### Seat Ghosting

Students frequently reserved study spaces by leaving personal belongings behind, resulting in unfair and inefficient use of limited seating.



### Space Shortage

Growing student population increased the demand for study areas, making it challenging for administrators to ensure equitable access.



### Lack of Real-Time Visibility

Without digital monitoring, library staff were unable to track actual seat usage or efficiently identify underutilized areas.



### Manual Management Burden

Relying on manual inspections and user reports led to delays, inconsistent data, and limited ability to optimize space utilization.

## Solution

To address the management challenges faced by the library, we have partnered with Sharp Peak to deploy a comprehensive IoT solution powered by advanced Milesight sensors and built upon a robust LoRaWAN backbone.

### Building a Scalable IoT Network

We deployed a campus-wide LoRaWAN infrastructure centered on the UG65 indoor LoRaWAN® Gateway, providing reliable, low-power, and highly scalable network connectivity for multiple floors of the library. This robust system easily supports coverage and centralized management of over 200 study spaces, enabling intelligent operations throughout the facility.

### Accurate Space Occupancy Management

WS101

To tackle core issues such as seat hogging and space utilization, we have deployed a variety of Milesight occupancy sensors to create a multidimensional monitoring network:

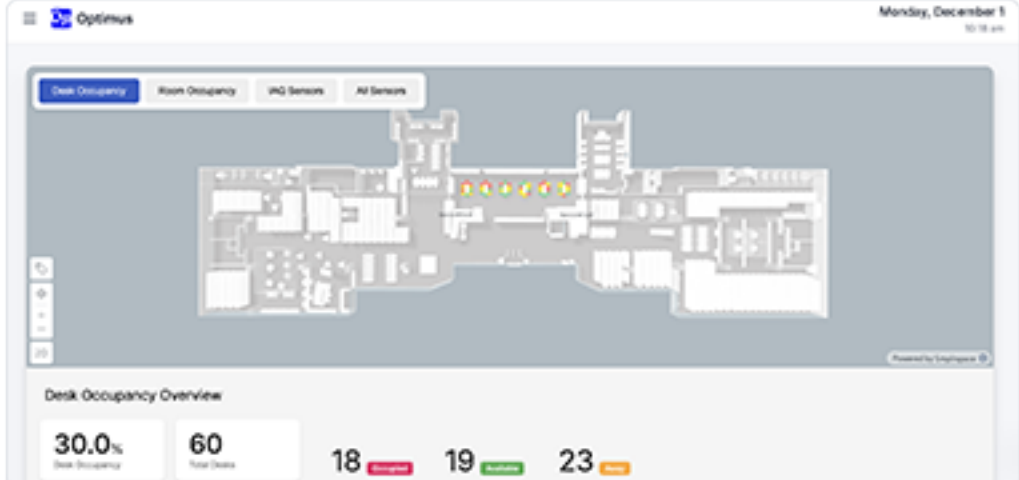
**Call Button**  
**Desk & Seat Occupancy Monitoring:**  
VS341 Desk & Seat Occupancy Sensors are installed at each study desk and table, precisely detecting whether seats are actively used.

**UG65**  
**Area People Counting:**  
In public areas such as stairways and study zones, devices including VS121 AI Workplace Occupancy Sensor, VS133x AI ToF People Counting Sensor, and VS351 Mini AI Thermopile People Counter are used to provide real-time headcount and crowd density monitoring.

### Innovative Intelligent Recognition and Visualization

**Machine Learning Algorithms:** Advanced machine learning models are integrated to intelligently analyze sensor data, accurately distinguishing between “active occupancy” and “passive seat hogging.” This provides crucial insights for resolving seat occupation challenges.

**Interactive 3D Floor Plan:** The real-time status of all spaces is displayed on a public webpage, with intuitive red, yellow, and green indicators on a realistic 3D floor plan. This delivers an unprecedented visualization experience for both users and administrators.



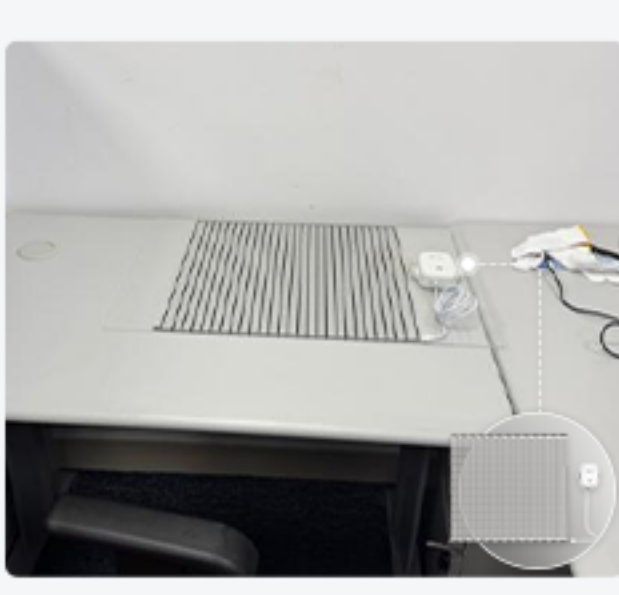
### Comprehensive Environmental and Facility Monitoring

Beyond space management, the solution extends to environmental safety and facility protection

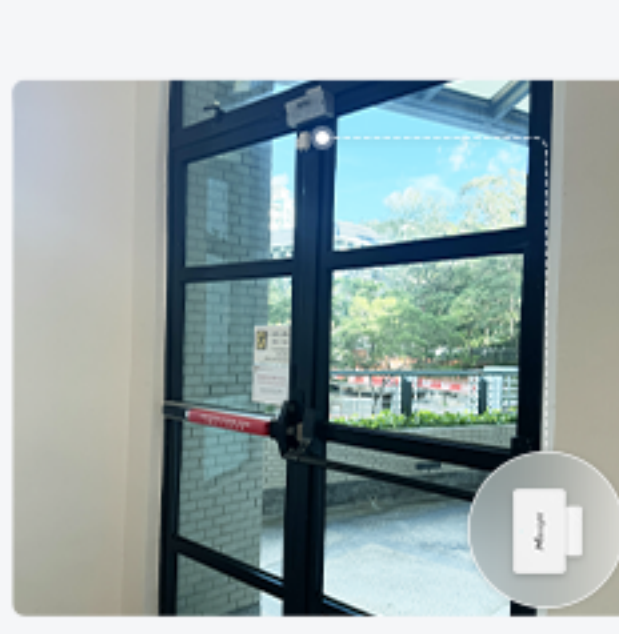
**Indoor Air Quality Monitoring:**  
AM308 8-in-1 and AM103 3-in-1 Indoor Air Quality sensors are deployed in public areas, library spaces, and washrooms to continuously monitor temperature, humidity, CO<sub>2</sub>, and VOC levels, ensuring a healthy and comfortable environment for all users.



**Water Leak Detection:** EM300-ZLD Leak Detection Sensors and EM300-MLD Membrane Leakage Detection Sensors are installed in critical areas such as archives to provide timely warnings of potential water risks, safeguarding valuable books and materials.

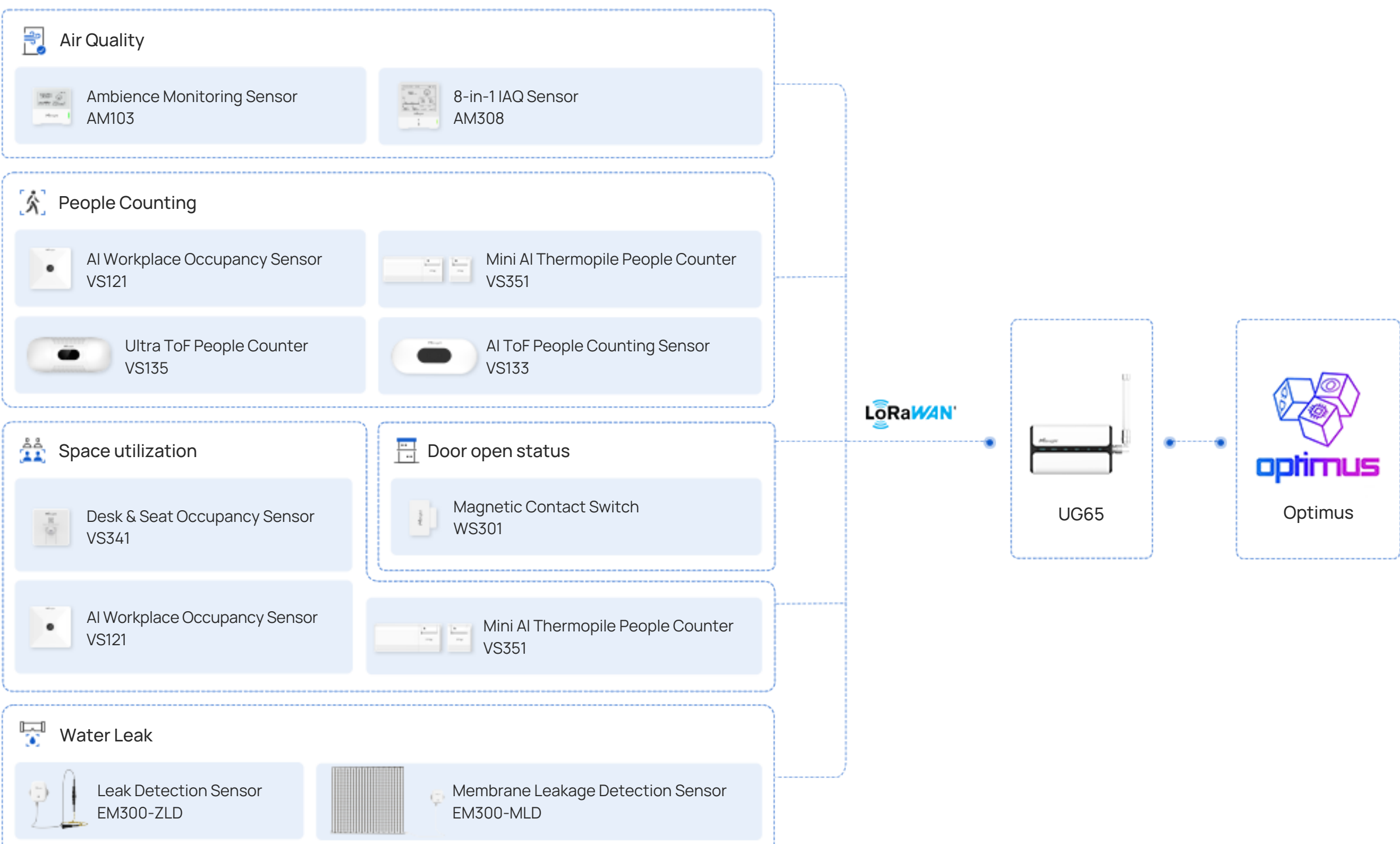
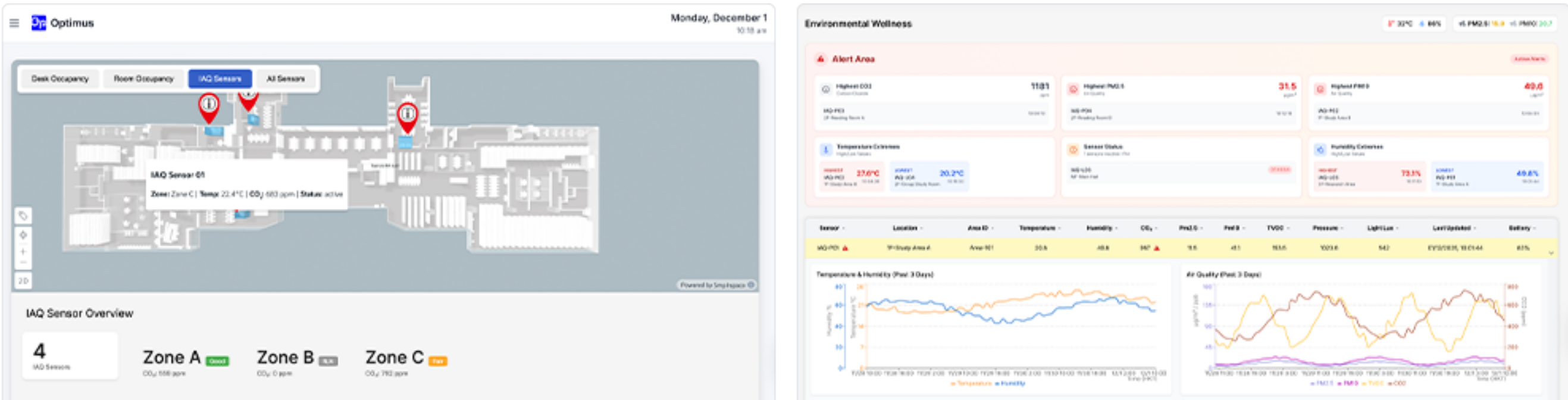


**Door Security Monitoring:** WS301 Magnetic Contact Switches are used to monitor the status of emergency exits, enhancing security management with automated alerts.



### Unified Integrated Management Platform

All Milesight sensor data is seamlessly integrated into Sharp Peak's proprietary Optimus IoT platform. This platform combines IoT data with the library's existing facility management systems, enabling unified data visualization, automated alerts, and intelligent reporting for streamlined operations.



## Results

By deploying a Milesight-powered IoT solution, Lingnan University Library has not only overcome key management challenges but also significantly enhanced operational efficiency and user experience.

### Effectively Resolving Seat Occupancy Issues for Fair and Efficient Space Utilization

The system displays real-time seat status and uses machine learning to identify passive seat hogging, enabling timely intervention and reducing seats being occupied by unattended items. Students can easily find available seats via digital signage and mobile apps, ensuring fair and efficient use of study spaces.

### Data-Driven Management for Improved Decision-Making

Library staff can monitor busy areas in real time, shifting from manual patrols to proactive data-driven management. Accurate usage forecasts support future planning and resource allocation, making management more forward-looking.

### Comprehensive Smart Safety and Security

Leak sensors provide early warnings in critical areas, protecting valuable collections. Magnetic contact sensors enhance emergency exit monitoring, with automated alerts improving overall security and creating a safer, more reliable environment.

## Why Choose Milesight



Milesight empowered Lingnan University Library with more than just sensors—it delivered a robust, scalable, and intelligent LoRaWAN ecosystem that transformed physical spaces into actionable, real-time insights. As a recognized innovator in IoT for smart buildings, Milesight's comprehensive portfolio of high-performance, reliable, and low-power AIoT devices, combined with seamless integration capabilities, enabled the library to precisely monitor, analyze, and manage resources across individual study carrels and busy common areas.



## Milesight Partner



Sharp Peak was founded with an idea to help organizations to transform their workplace through IoT implementation. Established in 2017 and headquartered in Hong Kong, we are a PropTech system integrator and an IoT technology solutions provider that innovate, design, implement and maintain smart workplace applications for organizations across the APAC region.