# Who We Are | 關於我們

## 物聯網解決方案供應商和製造商。

## 2020年於香港科學園區（Incu-Tech成員）

A leading IoT Solution Provider and Maker . Graduated in 2020 from Hong Kong Science Park (Incu-Tech program member).

# Our Vision | 願景

## 透過綠色消費技術
## 為智慧城市提供物聯網應用支援

Powering IoT applications for Smart Cities through green consumption technology.

引領全球分散式能源的韌性革命
Leading a resilient revolution in global distributed energy

# Academic Partnership | 學術合作

## 長期與香港本地大學進行研發合作，涵蓋研究創新和專案部署。

Long-standing R&D sponsorship and close collaboration with local university in Hong Kong, encompassing both research innovation and project deployment.

# Core Mission | 核心使命

## 為關鍵基礎設施提供物聯網感測器模組和先進的電池管理系統（BMS）

Delivering IoT Edge Sensor Modules and Advanced Battery Management Systems (BMS) for critical infrastructure.

# 技術核心：智能電池診斷算法

## The Technical Edge: Battery Algorithms

核心知識產權與技術壁壘。

- Diagnostic Cell Technology: Real-time estimation of State of Charge (SOC) and State of Health (SOH).
  **診斷單元技術：即時估計荷電狀態 (SOC) 和健康狀態 (SOH)。**
- Advanced Modeling: Utilizing “Constant Phase Elements” (CPE) for superior accuracy over traditional RC networks.
  **高階建模：利用「恆相位元件」（CPE）實現比傳統RC網路更高的精度。**
- Machine Learning: Modified Particle Swarm Optimization (PSO) for parameter estimation.
  **機器學習：改進的粒子群最佳化（PSO）用於參數估計。**
- Benefit: Predict battery lifetime and detect early failure without service interruption.
  **優點：預測電池壽命並及早發現故障。**

# Miot 進行中的項目
## Ongoing Project

電池管理系統 (BMS) 技術目前正在整合到物聯網 (MIoT) 系統中。

- Active Balancing: Ensures battery stacks operate at peak efficiency and health.
  **主動均衡：確保電池組以最佳效率和健康狀態運作。**
- BCDM Implementation: Semi-automated Battery Charging Discharging Module with WiFi telemetry.
  **BCDM實現：具有WiFi遙測功能的半自動電池充放電模組。**
- Real-Time Data: Uploads Charging/Discharging Current, Voltage, Ah, and temperature directly to servers via 4G/Network.
  **即時數據：透過 4G/網路直接將充電/放電電流、電壓和溫度上傳到伺服器。**
- Integration: Working toward seamless Energy Storage Systems (ESS) integration.
  **整合：致力於實現儲能係統（ESS）的無縫整合。**

# 人工快速目檢：排除外觀嚴重損壞、漏液

## Quick manual visual inspection: exclude batteries with severe external damage or leakage

嚴格檢驗標準，確保安全性。
Strict testing standards ensure safety.



檢測內容：
- 外殼破損、鏽蝕、膨脹
- 接頭氧化、螺絲完整性
- 長寬高尺寸測量（判斷是否變形）

Inspection Items:
- Casing damage, corrosion, and expansion
- Connector oxidation and screw integrity
- Length, width, and height measurements (to determine if deformation is present)

# 人工快速目檢：用萬用表測量電壓

## Quick manual visual inspection: Use a multimeter to measure the voltage.

嚴格檢驗標準，確保安全性。

Strict testing standards ensure safety.

在電池進行充放電測試前，快速篩選出電壓異常（過高或過低）的單體，確保：

1. 安全性：避免電壓極度異常的電池在後續測試中發生危險。
2. 測試有效性：只對電壓在合理範圍內的電池進行性能評估，節省時間與資源。

Before charging and discharging batteries undergo testing, quickly identify cells with abnormal voltage (too high or too low) to ensure:

1. Safety: Prevent batteries with extremely abnormal voltage from posing a danger in subsequent tests.

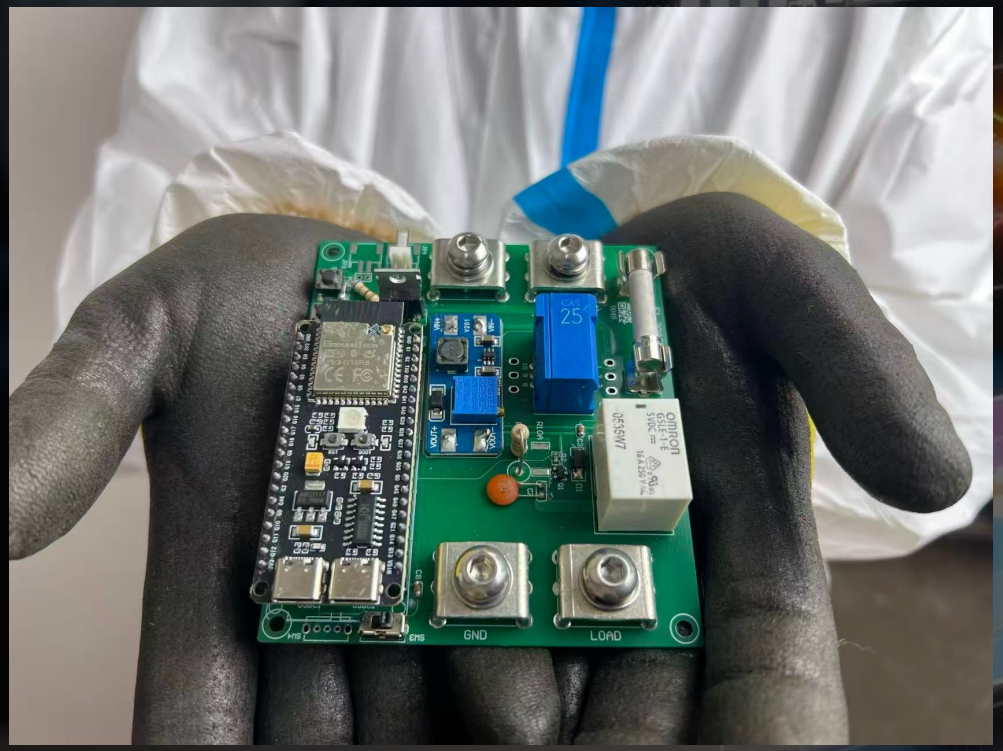
2. Testing effectiveness: Only evaluate the performance of batteries with voltages within a reasonable range, saving time and resources.

# 自主專利的電池充放模組（BCDM）

## A **proprietary** battery charge-discharge module (BCDM).

連接測電池模組，啟動專利測試算法與精準控制系統的，確保後續數據的可靠性與獨特性

Connecting to the battery testing module activates the patented testing algorithm and precision control system, ensuring the reliability and uniqueness of subsequent data.




電池測試模組

Module for battery test

電池模組接入 BCDM，電阻負載連接

Battery module connected to BCDM, resistive load connection

# 自主專利的電池充放模組（BCDM）

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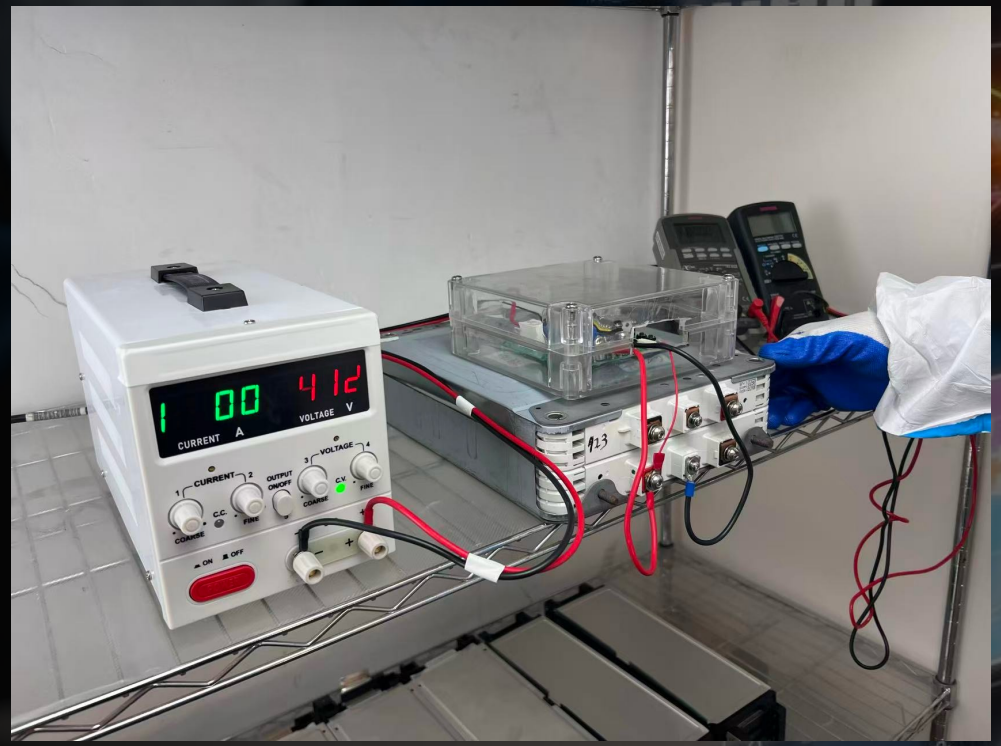
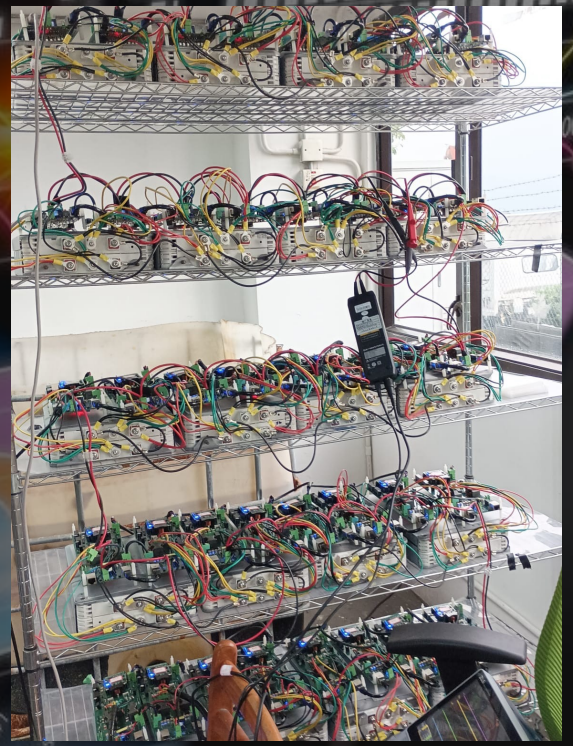



電池測試模組

Module for battery test



每一個BCDM都是一個獨立的數據採集站。它們在執行精準充放電的同時，將電壓、電流、容量、溫度等關鍵參數轉化為數字信號，透過專利通訊架構匯聚至中央管理系統，構成了退役電池全生命週期數據畫像的起源點。其模組化設*更支援輕鬆擴展，靈活應對從單體到模組的不同規模測試需求。

Each BCDM is an independent data acquisition station. While performing precise charging and discharging, they convert key parameters such as voltage, current, capacity, and temperature into digital signals, which are then aggregated to the central management system through a patented communication architecture, forming the origin point for a complete lifecycle data profile of retired batteries. Its modular design also supports easy expansion, flexibly addressing different scale testing needs from single cells to modules.

# 電池測試數據採集程序

Data collection program for battery test : The module for the battery test will upload data to computer via wifi

嚴格檢驗標準，確保安全性。

Strict testing standards ensure safety.


實時監測畫面：放電測試進行中
圖中顯示MIOT專利測試系統正對單個電池單元進行精準的放電測試。

Real-time monitoring screen: Discharge test in progress
The image shows the MIOT patented testing system performing a precise discharge test on a single battery cell.


實時監測畫面：充電測試進行中
圖中顯示同一電池單元（設備036）在完成放電後，正進行精準的恆流充電測試。

Real-time monitoring screen: Charging test in progress. The image shows the same battery cell (device 036) undergoing a precise constant current charging test after discharging.

# 二次生命電池儲能中心|梯次利用標準

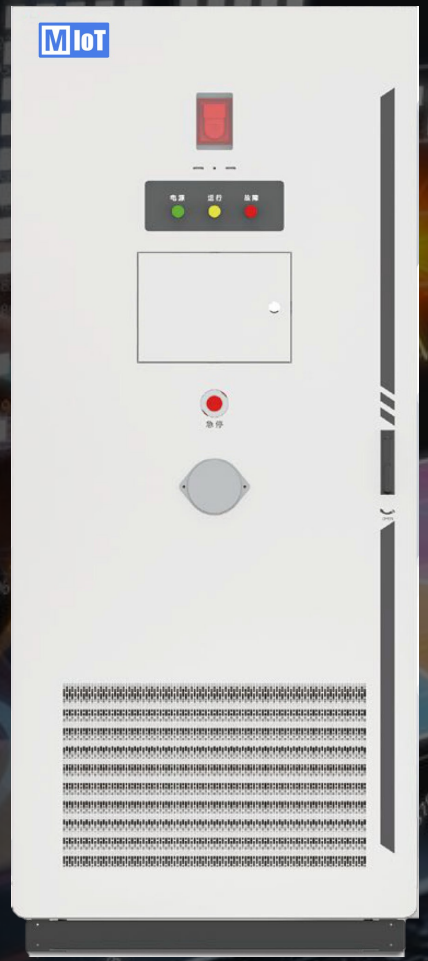
推動綠色轉型與實現「雙碳」目標的關鍵力量，它融合了環境治理、資源迴圈、清潔能源與智能技術，正在重塑全球產業格局。

# 電池儲能櫃系統 Battery Energy Storage System

**電池儲能係統（BESS）符合IEC 62933-5標準**

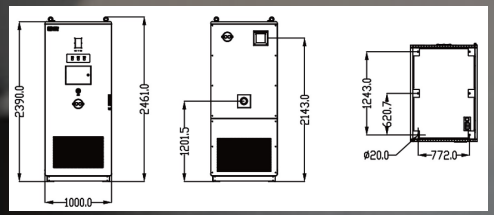
**The battery energy storage system (BESS) is compatible with IEC 62933-5.**

正在測試採用退役電動車電池的儲能係統
Energy storage system with retired EV batteries under test




**Technical Specifications**

| | |
|---|---|
| Power | 100kW |
| Energy | 266kWh |
| AC voltage | 380Vac (+/-6%), 3-phase 4-wire, 50Hz/60Hz<br>480Vac (+/-6%), 3-phase 4-wire, 50Hz/60Hz (optional)<br>Four quadrant operation |
| Mode of Operation | Island mode and on-grid mode |
| DC sources | PV/ hydrogen fuel cell |
| Overload capacity | 110% (30 minutes)<br>110 – 125% (1 minute)<br>125 – 150% (200ms) |
| Current imbalance | 100% max. |
| Battery | Lithium batteries, UN 38.3, UL 1973, IEC 63056 |
| PCS | UL1741, IEC62477 |
| Communications | Protocol: Modbus TCP, Modbus serial<br>Ethernet port: Copper RJ45 Port (< 100m distance)<br>Serial port: standard RS485 |
| Enclosure dimension | 2100 x 1300 x 2350 (mm) (to be revised) |
| Estimated weight | 4 metric tons (to be revised) |
| IP protection | IP54 or above |
| Fire protection | Please specify |
| Operating temperature | -20ºC to 50ºC |
| Relative humidity | 5% to 95% non-condensing |
| Certifications | BESS: UL9540 (pending)<br>Power conversion system: UL1741 incl. supplement SA/SB/CRD, CSA 22.2, IEC 62109-1, IEC 61000-6-2 (pending)<br>EMC: EN61800-3 (pending)<br>Harmonics: IEEE 1547, IEEE 519 (pending)<br>Battery: IEC62619, UL9540A, UL1973, UN38.3 (pending) |
| Warranty | Warranty: Onsite parts and labor (duration = 1 year)<br>Services: Startup, preventive maintenance, extended warranty, spare parts kits, and remote support |

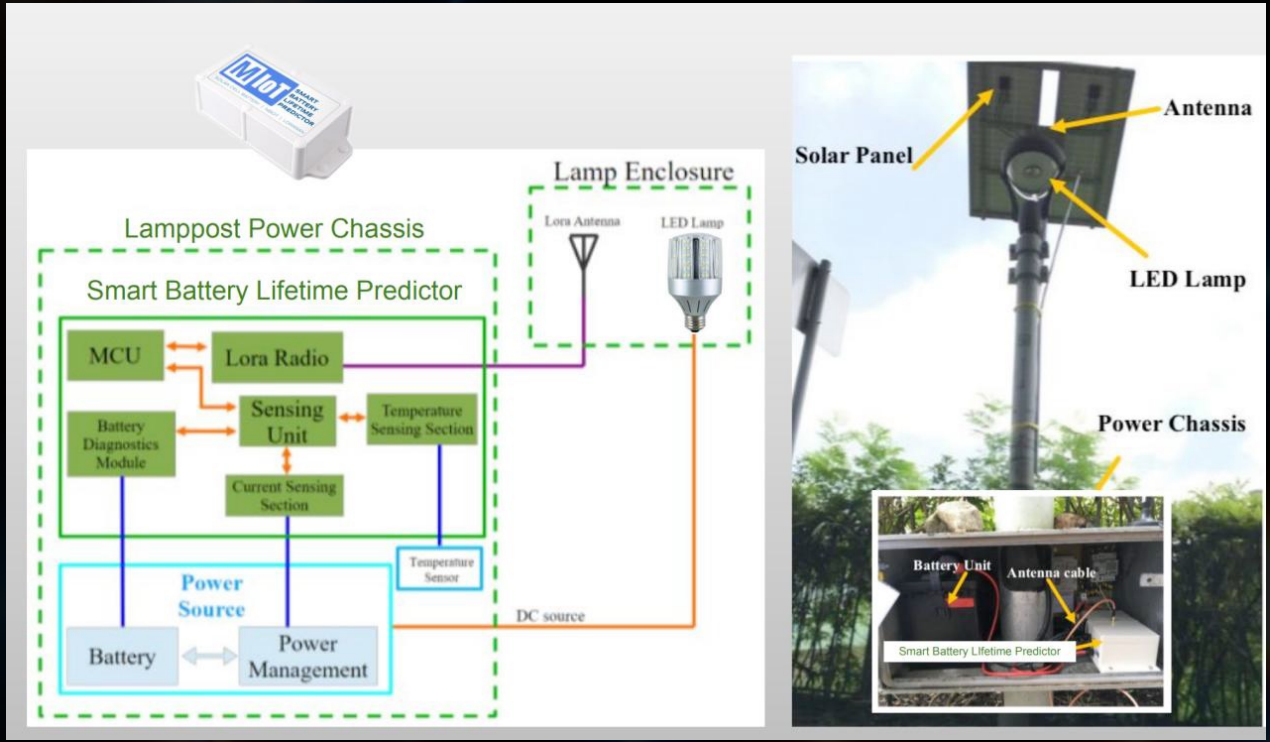



MIoT

# MIoT 案例參考

## Smart Energy - EMSD

# Solar Lamppost Battery Monitoring







Challenge:
Retrofitting legacy solar lampposts with smart monitoring capabilities.

Solution:
Deployed 143+ smart poles with LoRaWAN connectivity.

Outcome:
Automatic lamp failure detection.
Remote battery lifetime prediction.
Reduced on-site inspection costs.

## Smart Energy - EMSD

# Solar Lamppost Battery Monitoring

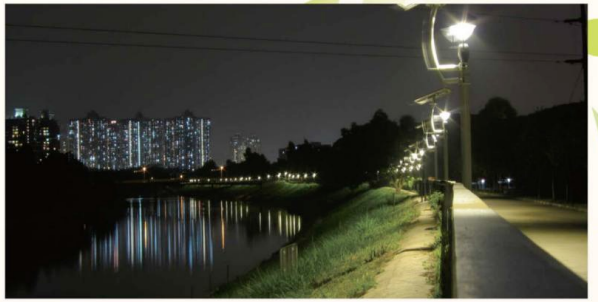
**新**界北區梧桐河上游在安裝了太陽能發光二極管燈後，該處一帶的照明情況已大為改善。有關照明工程是北區區議會撥款進行的其中一項梧桐河改善計劃項目，讓河堤晚間的環境得以改善，推動可持續發展。

機電工程署在這項全港首次進行的大規模太陽能發光二極管燈安裝工程中，沿梧桐河上游2.6公里的河堤裝設了143支太陽能燈柱。每支燈柱都配備發光二極管光源、光伏板、控制器及備用電池。由於燈柱本身已是獨立的可再生能源發電系統，因此無需進行挖掘及鋪設地下電纜與電網接駁，既節省成本及安裝時間，又更為環保。

裝設發光二極管燈後，梧桐河上游的河堤較前更為光亮，不但方便居民往來鄰近村落，亦吸引遊客前來散步，欣賞河堤的優美景色。這些太陽能燈投入服務已逾一年，表現一直令人滿意，即使天氣惡劣亦不受影響。

實地檢查太陽能燈柱以確保照明系統運作可靠。
Site inspection of the solar lighting posts to ensure reliability of the lighting system.

## 綠色科技 照亮梧桐河
## Green Technologies
### Brighten Up Ng Tung River



梧桐河上游沿岸在太陽能發光二極管燈的映照下，景色格外優美。
A scenic view of the upper Ng Tung River embankment illuminated by solar-powered LED lighting.

The upper stretch of Ng Tung River at the northern New Territories has been significantly brightened up thanks to the installation of solar LED lighting as part of a North District Council-funded project to improve the environment of embankment at night in a sustainable way.

In the first large-scale installation of solar-powered LED lighting in Hong Kong, 143 solar lighting posts were installed by EMSD along 2.6 kilometres of embankment. Each post includes an LED light source, photovoltaic panel, controller and backup battery. As standalone renewable energy systems, the installations removed the need for excavation and underground cabling work to connect them to the grid, thus saving construction cost and time, and are also more environment-friendly.

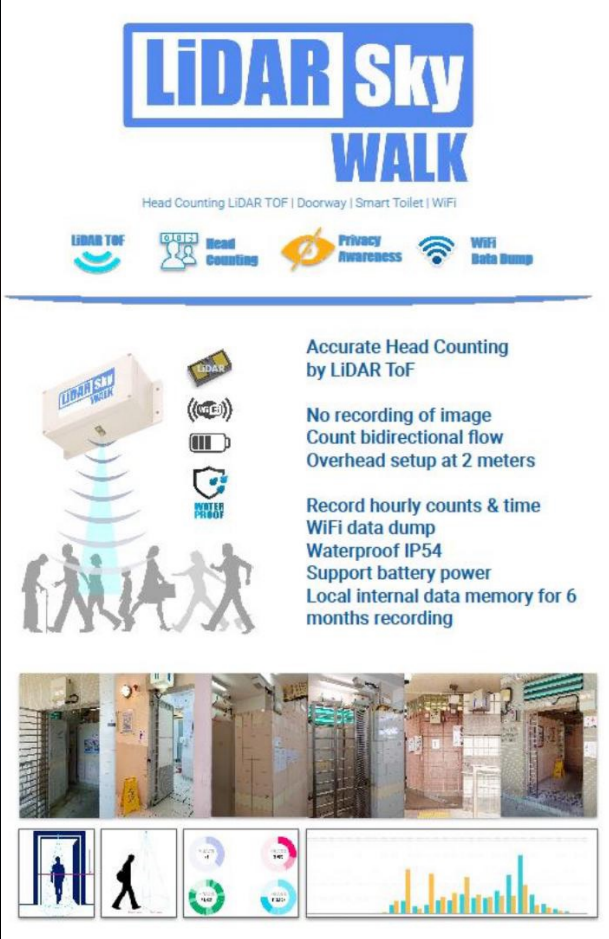
The LED lighting system has lit up the Upper Ng Tung River embankment, facilitated residents' access to the nearby villages and attracted visitors to stroll along the scenic riverbank. The solar lighting has already served the public well for over a year, with satisfactory performance even under adverse weather conditions.

**LED太陽能街燈遙距監察暨智能實時電池狀態和健康診斷系統**

| | |
|---|---|
| 試驗項目名稱 | LED太陽能街燈遙距監察暨智能實時電池狀態和健康診斷系統<br>(編號: P-0002) |
| 已配對創科願望 | 利用物聯網監控LED太陽能街燈<br>(編號: W-0063) |
| 已配對創科方案 | 智能實時電池狀態和健康診斷系統<br>(編號: S-0058) |

## Smart Hygiene- FEHD

# IoT People Counter System




Technology: ST Microelectronics Time-of-Flight (ToF) LiDAR sensors.

Key Features:
- Privacy-compliant (no images recorded).
- High accuracy with Bi-directional counting.
- Rugged IP54 watertight housing.

Power: Autonomous battery operation (50+ days) with 4G remote alerts.

## Shatin Heritage Museum Theatre

# Complex Integration


Scope: Hybrid IoT network managing 389 Seat

Sensors(Sigfox) and 7 Door Radars (NBIoT).

Integration: Bridging wireless IoT sensors with wired Building Management Systems (HVAC) via Modbus RTU.

Outcome:
- Real-time crowd control dashboards.
- HVAC energy optimization based on live occupancy.
- Digital signage integration.


# THANK YOU

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