



Intelligent Future.
— 智能未來 —



Cross Industrial IOT Application

Stephen Wai – Sr. Mgr. Business Development
swai@lscm.hk



Hong Kong R&D Centre for Logistics and
Supply Chain Management Enabling Technologies



LSCM R&D Centre



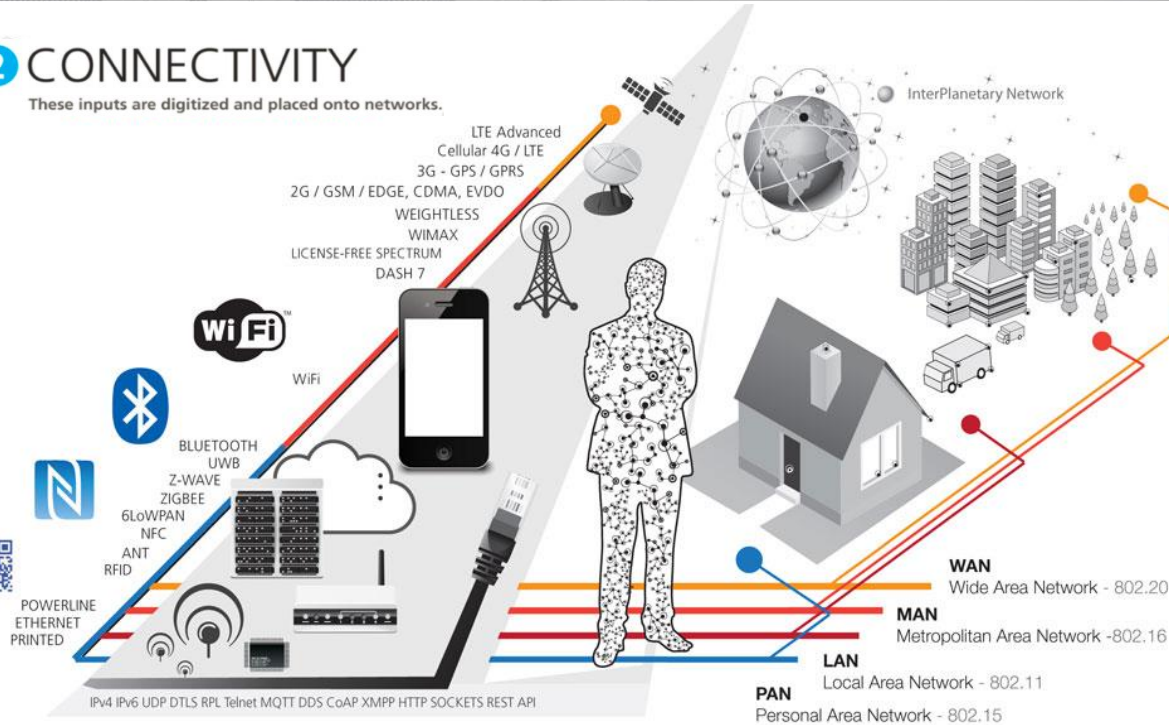


Intelligent Future.

智能未來

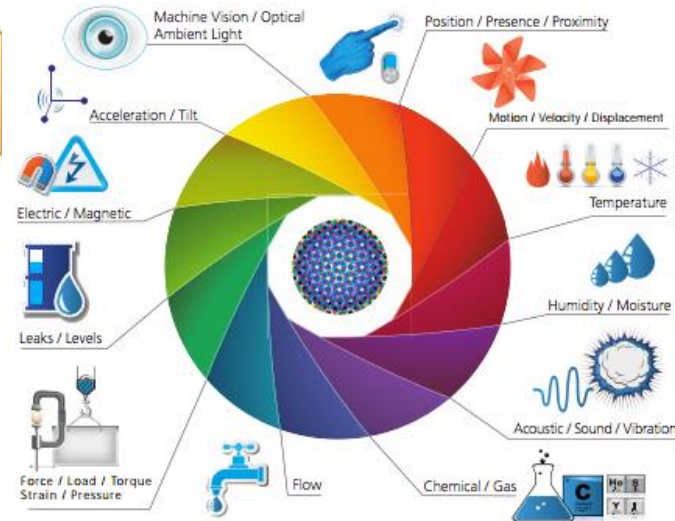
2 CONNECTIVITY

These inputs are digitized and placed onto networks.



1 SENSORS & ACTUATORS

We are giving our world a digital nervous system. Location data using GPS sensors. Eyes and ears using cameras and microphones, along with sensory organs that can measure everything from temperature to pressure changes.



3 PEOPLE & PROCESSES

These networked inputs can then be combined into bi-directional systems that integrate data, people, processes and systems for better decision making.

[Source: Postscape - <https://www.postscapes.com/what-exactly-is-the-internet-of-things-infographic/>]



Key questions to address

What

is the object?

When

a task is completed?

Where

is the object or the incident happen?

Who

completed the task?



Key questions to address

What

really the objects are?

When

a task will complete?

Where

exactly is the object or the incident happen?

Who

will complete the task and exactly whom?



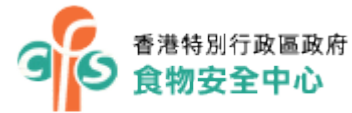
Key Challenges

- Power Supply
- Connectivity
- Accuracy
- Security & Privacy
- ROI



RFID-based Live Pig Supervision between Guangdong (GD) and Hong Kong (HK)

- ❖ **Objective:** To facilitate e-logistics information exchange and supply chain applications between GD and HK
- ❖ **Technology:** Embedded RFID ear tags, barcode and cross-boundary information service platform
- ❖ **Benefits:** Source tracking and monitoring, local delivery tracking



而這個訊息系統能提供每個豬隻個體的識別

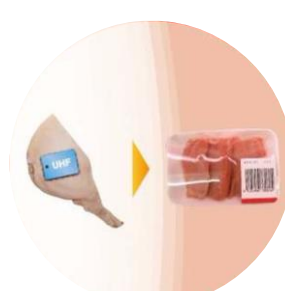


現在，香港每日約有四千頭活豬



Intelligent Future.

— 智能未來 —



Sheung Shui Slaughter House Passageway





Smart Warehouse for Wine Industry

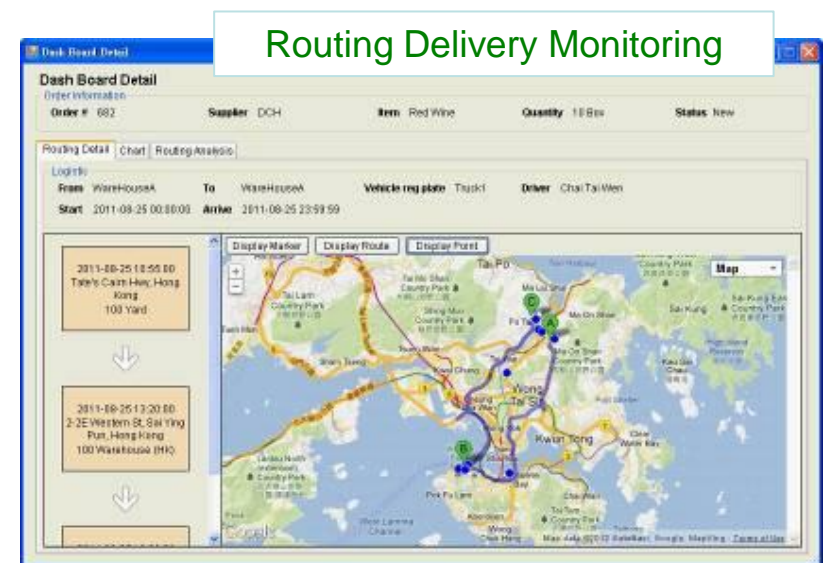
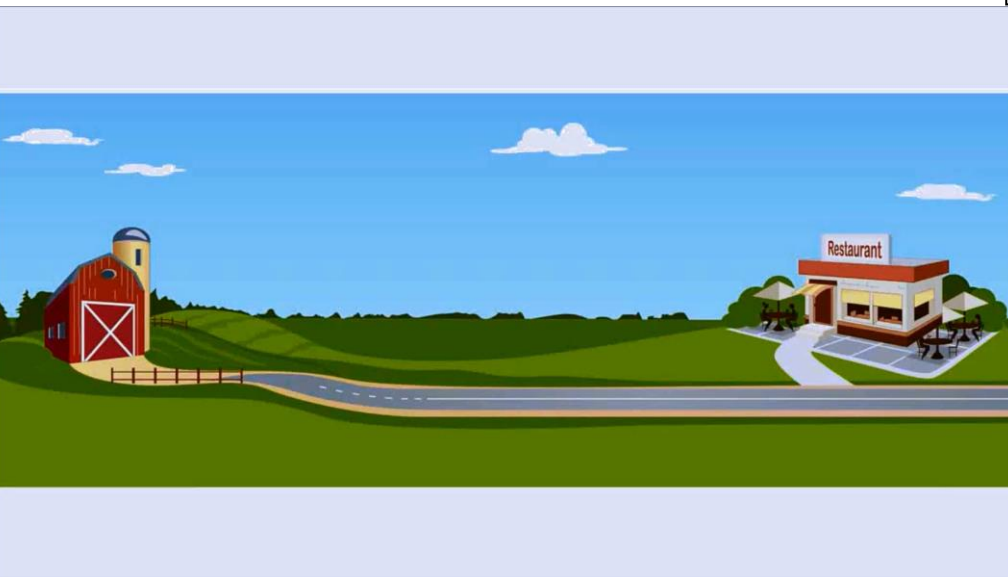
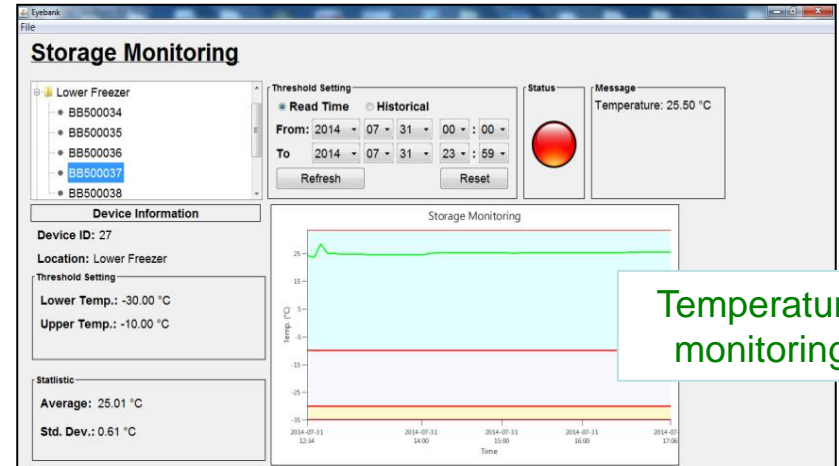
- ❖ **Objective:** Enhance anti-counterfeiting for high-end products
- ❖ **Technology:** UHF RFID reader, UHF tag design
- ❖ **Benefits:** Enable product authenticity check, secure private certification storage





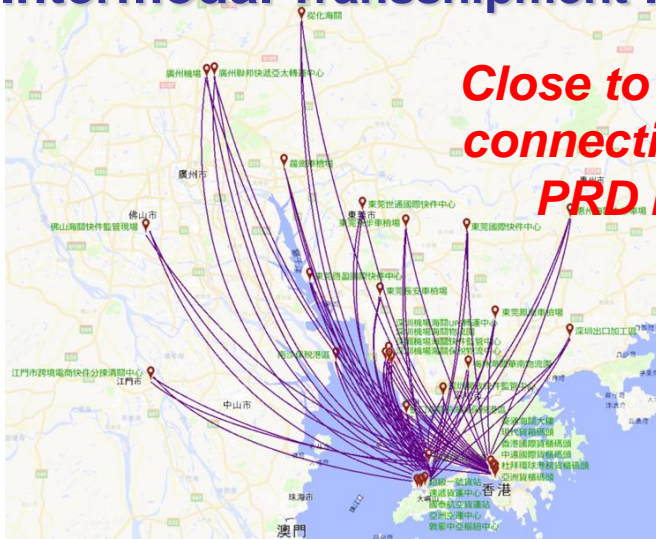
Cold Chain Management System for Perishable Produces

- ❖ **Objective:** Tracking and tracing of vegetable
- ❖ **Technology:** GPS, wireless sensor reader (with 3G), temperature sensor, RFID and location tracking
- ❖ **Benefits:** Enable tracking the processing and storage of vegetable with temperature data, enable analysis over the logistics





Intermodal Transshipment Facilitation Scheme using E-Lock Technologies



Close to 300 routes connecting HK and PRD Region.



Single E-Lock ITFS launched on 28 March 2016

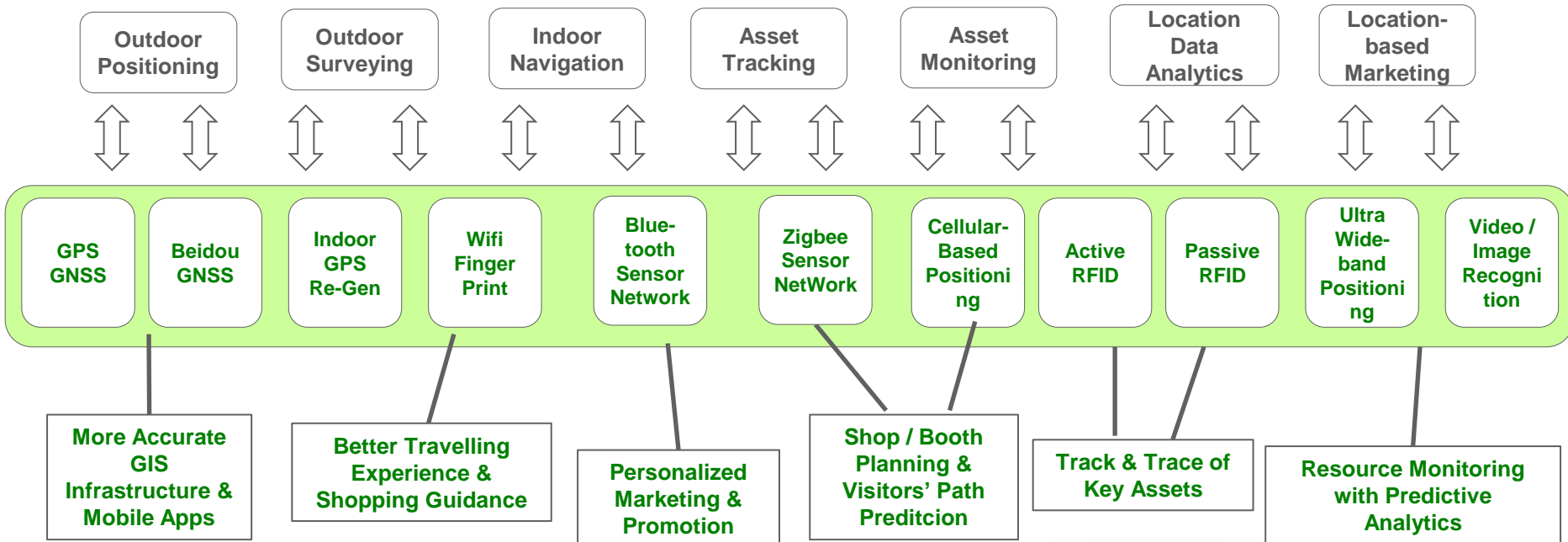


可以在檢查E-LOCK之後用手持閱讀器



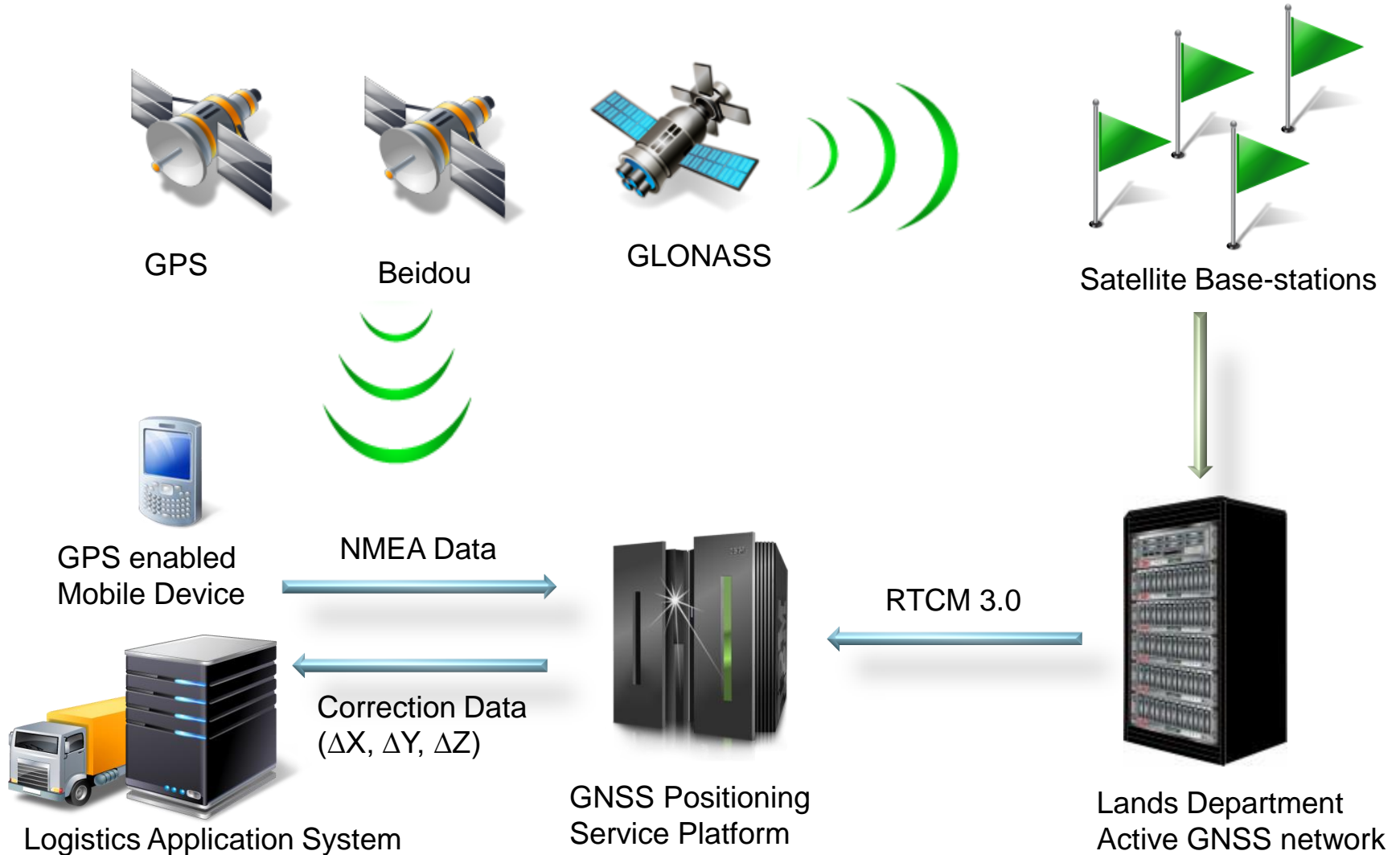


Overview of HK's Research and Technological Capabilities in LBS/RTLS



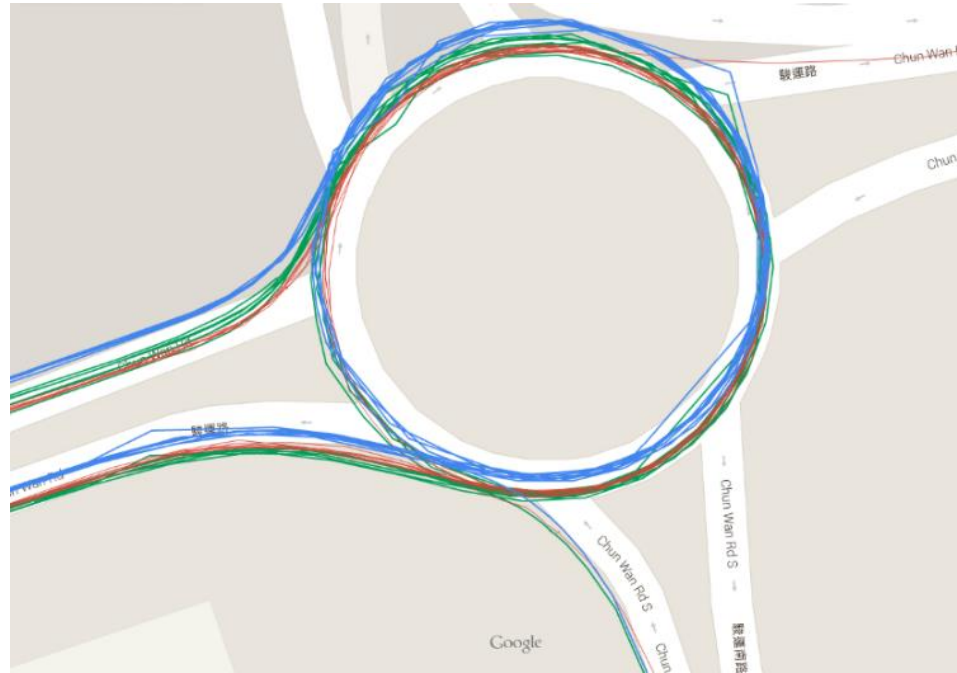
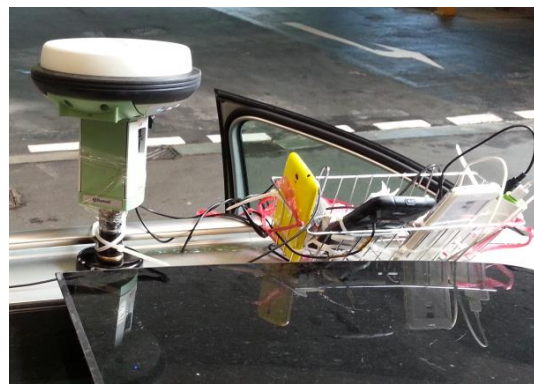
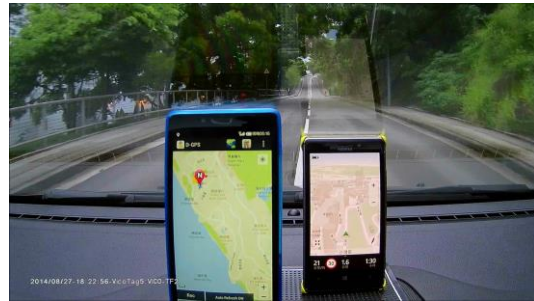


DGPS Technology ride on GNSS Positioning Infrastructure





DGPS corrected Data



Mobile Phone GPS function

Accuracy	
Mean (m)	RMS (m)
4.1	4.5

RTK (Survey-grade Equipment)

Accuracy
Centimeter level accuracy
Benchmark purpose

DGPS

Accuracy	
Mean (m)	RMS (m)
0.4	1.8

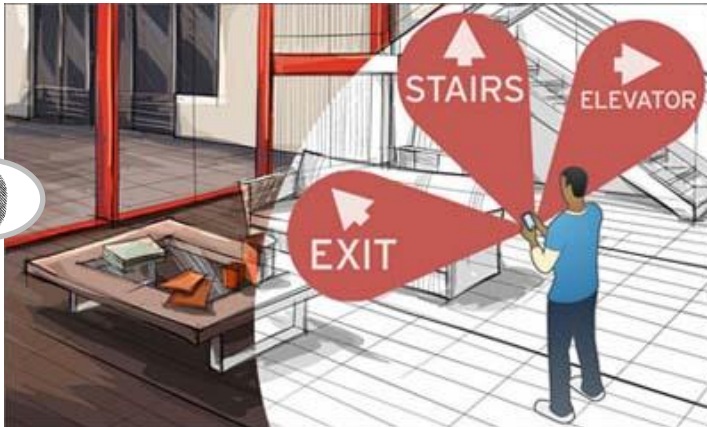


Indoor Navigation Solution via Wi-Fi Fingerprint

- ❖ **Objective:** Deployment of Location-Based Services (LBS) to airport visitors and travelers
- ❖ **Technology:** Wifi Fingerprinting, Map matching, Inertial Measurement
- ❖ **Benefits:** Deployment of Indoor localization on common smartphones based on WiFi infrastructure



the Hong Kong International Airport



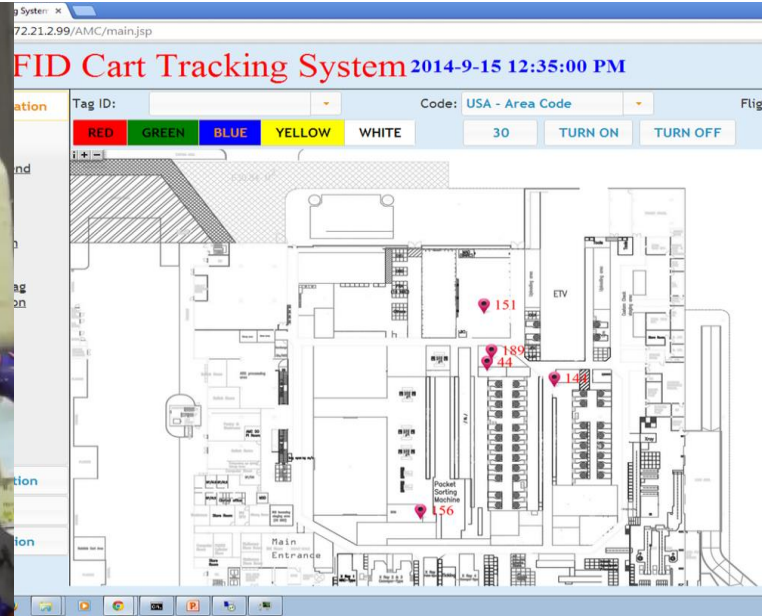
Whereami
Android Application



Intelligent Future.

— 智能未來 —

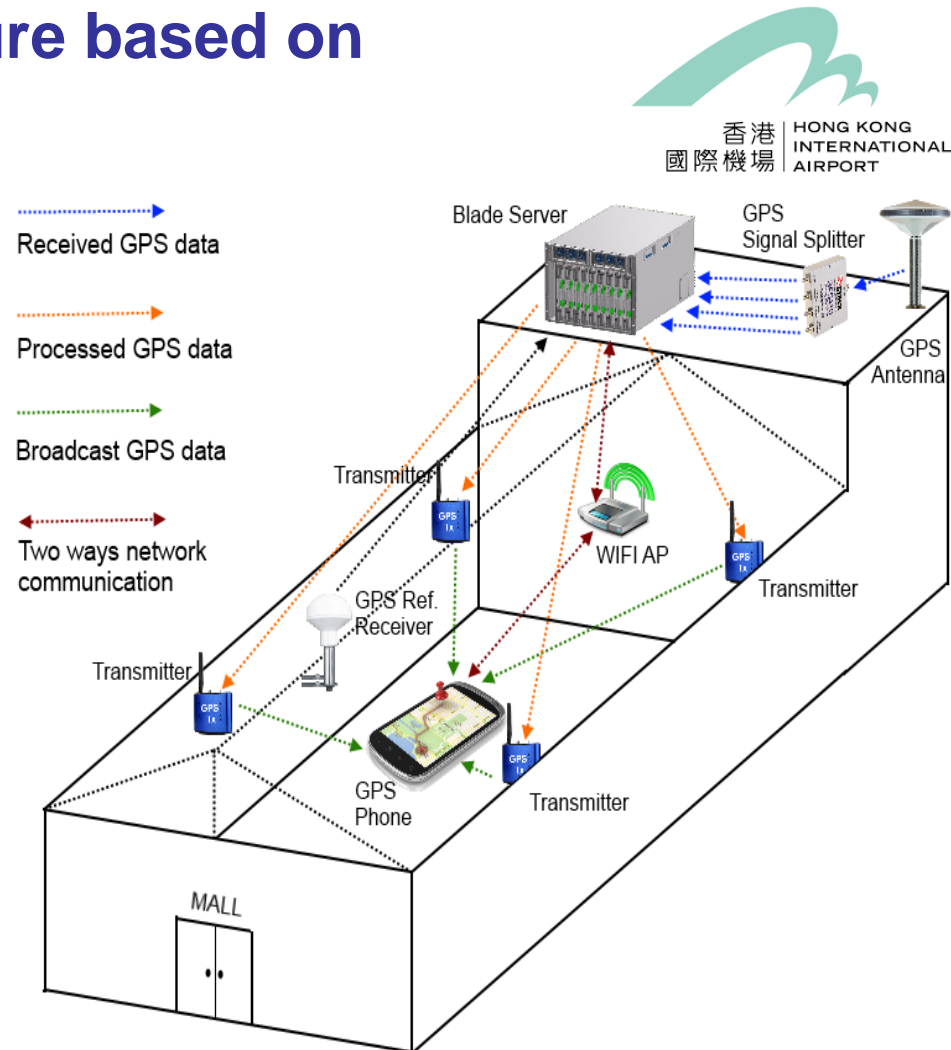
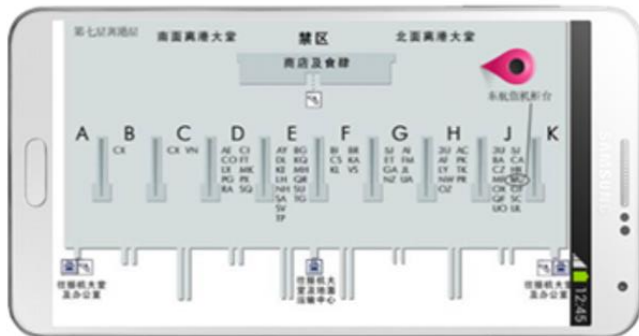
Active RFID Real time In-door positioning





Indoor Positioning Infrastructure based on GPS technologies

- ❖ **Objective:** Enable GPS signals to be received indoor by mobile devices and smartphones for positioning and navigation indoor
- ❖ **Technology:** Processing and conversion of outdoor GPS signals for common smartphone usage
- ❖ **Benefits:** High accuracy seamless positioning to support Internet-of-things and LBS can be achieved and accuracy will be about 2-5m.





Video Analytics for resources planning



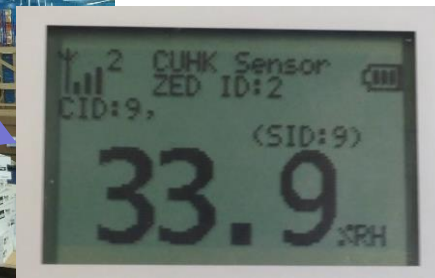
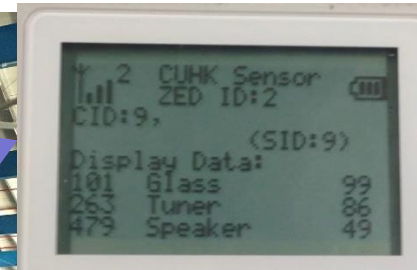
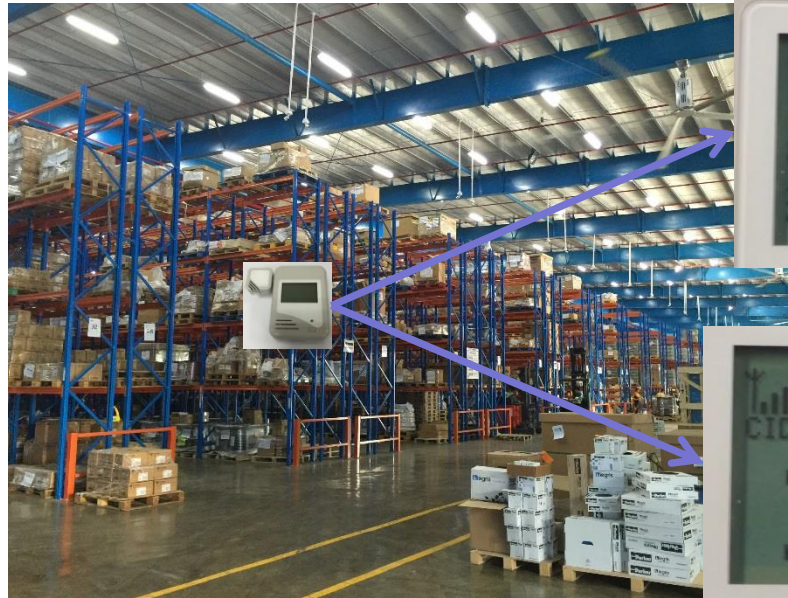
- ❖ **Objective:** Enabling traveler's trolley bottleneck detection, prediction, and improve availability
- ❖ **Technology:** Video and sensor equipment, image analytics and sensor devices, Machine Learning, Pattern recognition
- ❖ **Benefits:** Timely information for requesting appropriate trolley replenishment

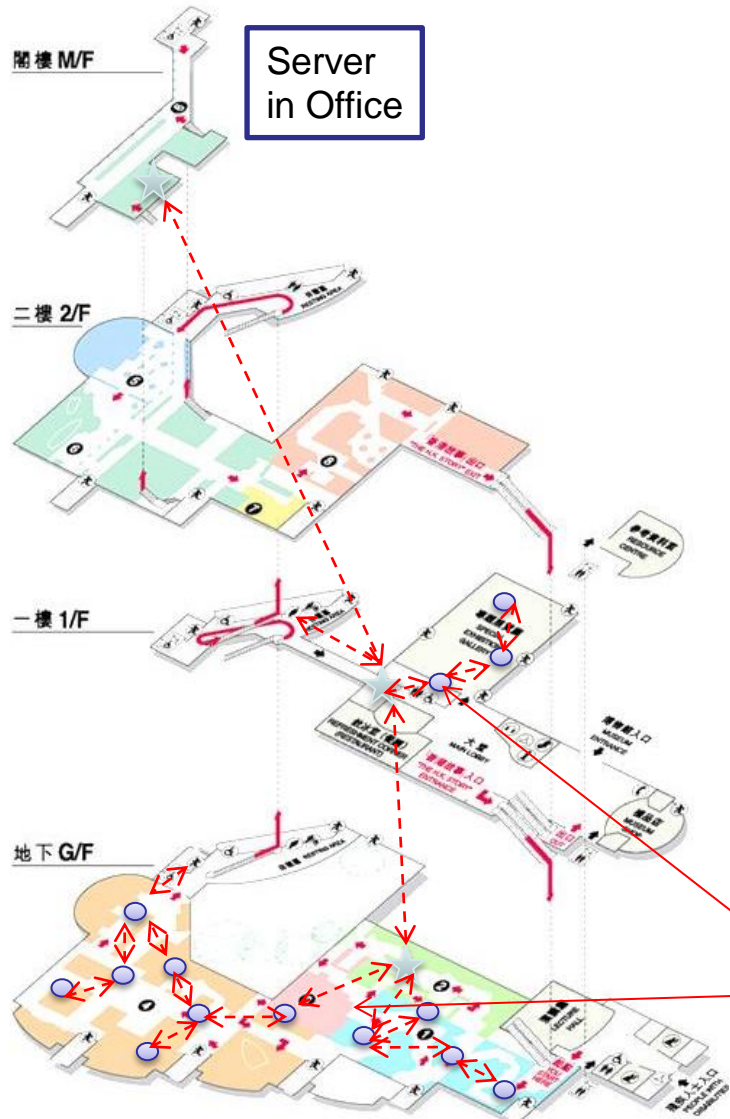




Sensing Network for Smart Warehouse

- ❖ **Objective:** Wireless and low cost multiple sensing network for surrounding environmental condition
- ❖ **Technology:** Zig-bee,
- ❖ **Benefits:** Interchangeable sensor, plug & play,





Hong Kong Museum of History

- Entirely Wireless Network Infrastructure Layout

★ Reader Coordinators

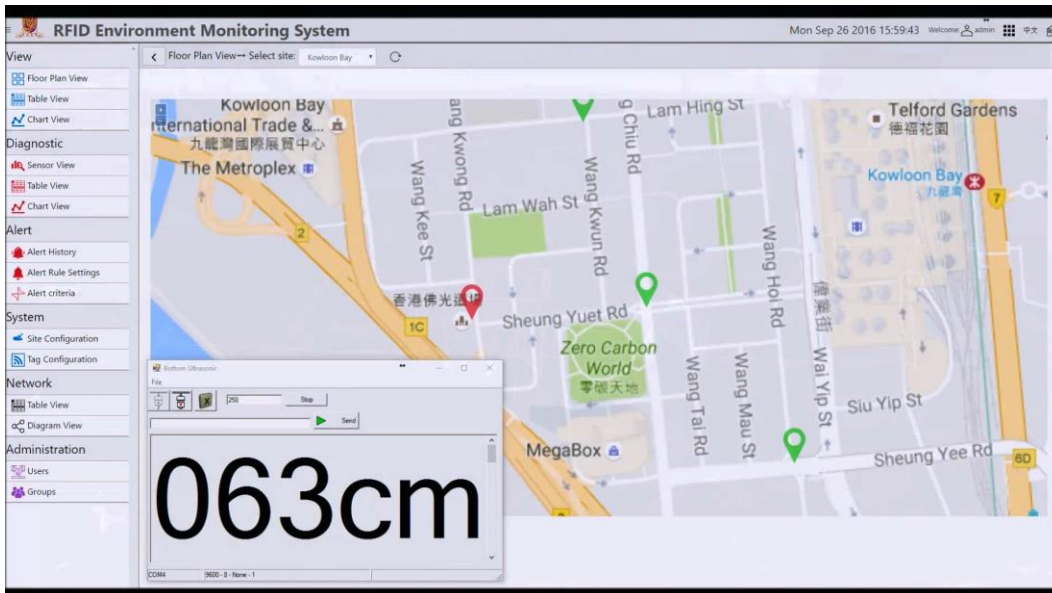
○ Reader Routers

Wireless Connection



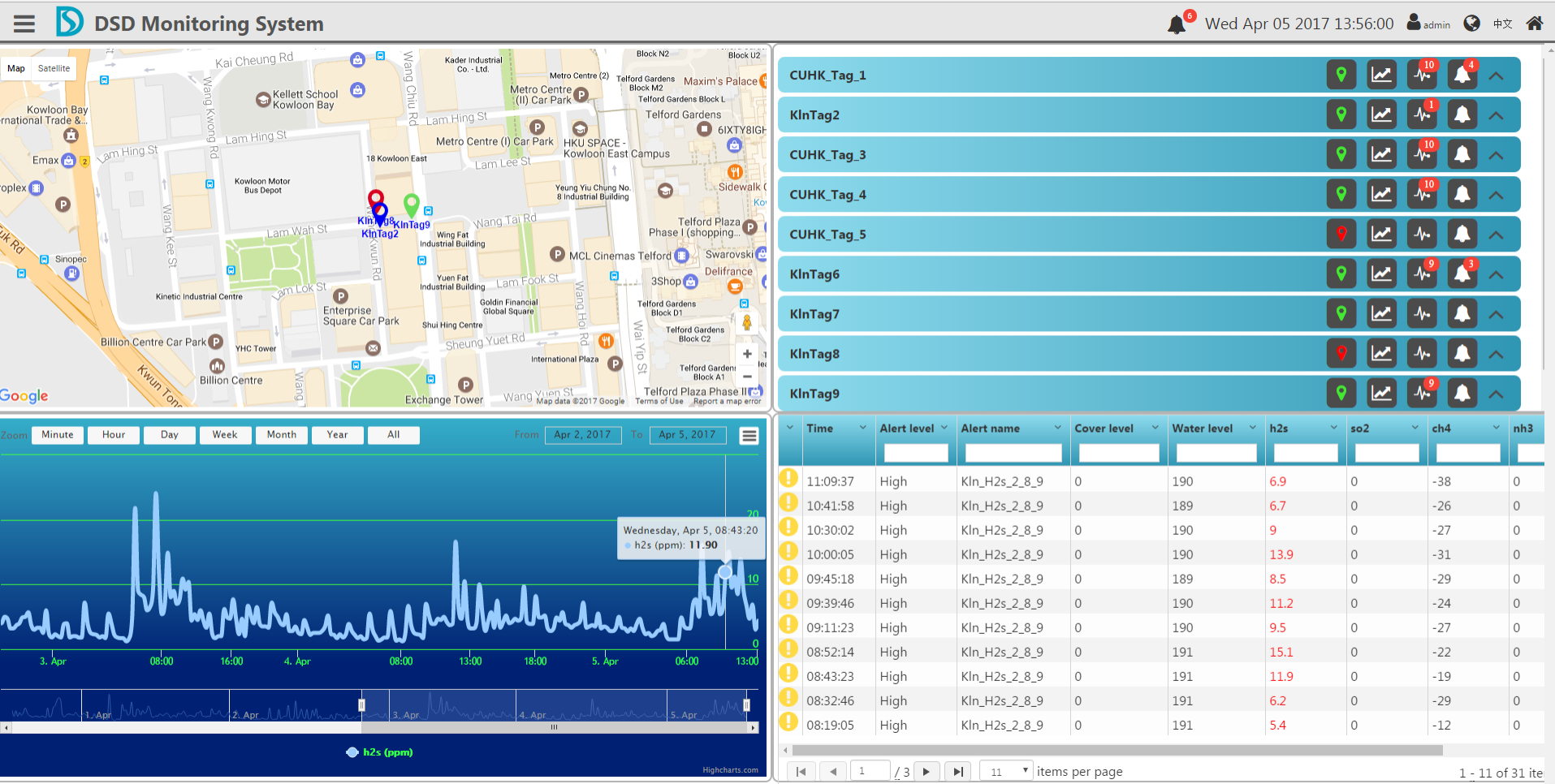
Sensing and Ubiquitous Wireless Network for Smart Drainage System

- ❖ **Objective:** Real time monitoring water level, hazardous gas and illegal opening of man hole.
- ❖ **Technology:** RF communication, antenna network, sensors
- ❖ **Benefits:** preventive maintenance, real time alert



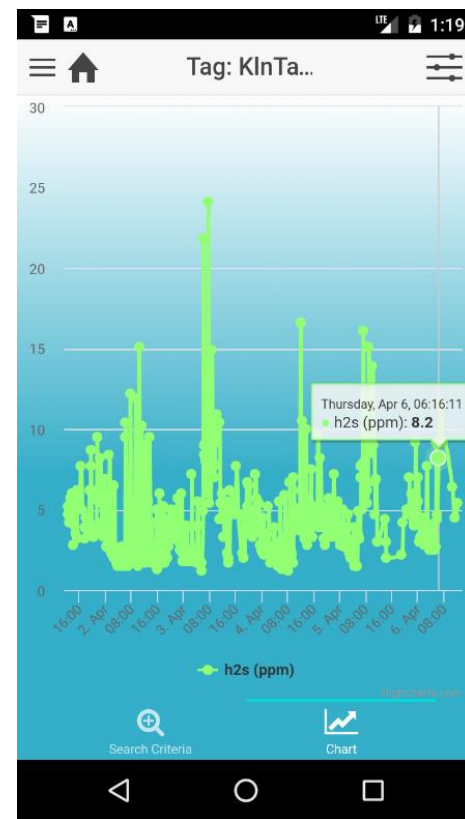
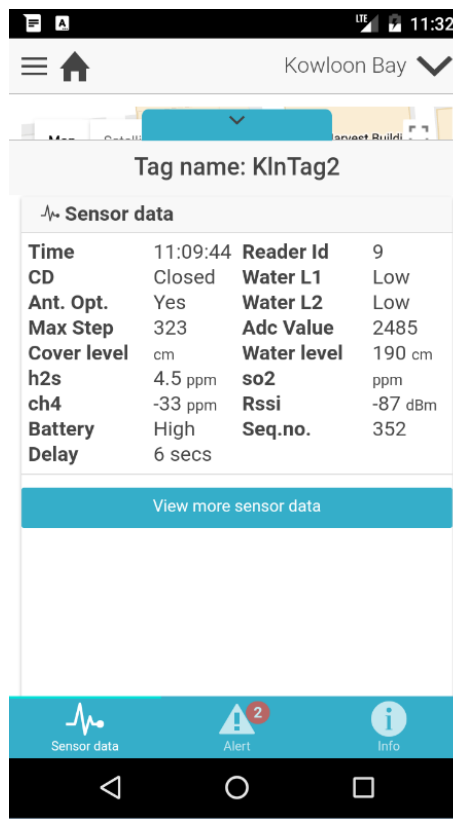
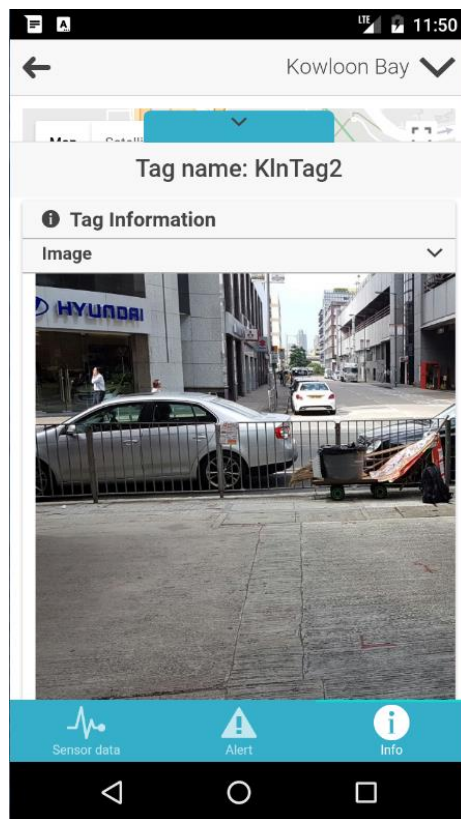
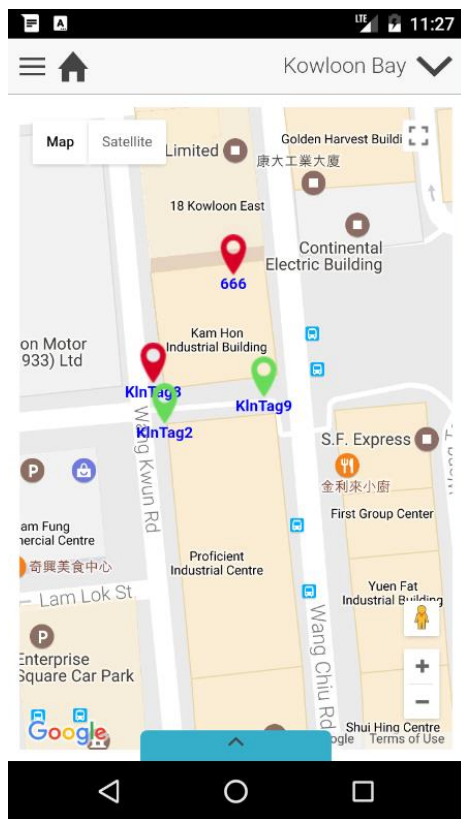


The Monitoring System – Dashboard View



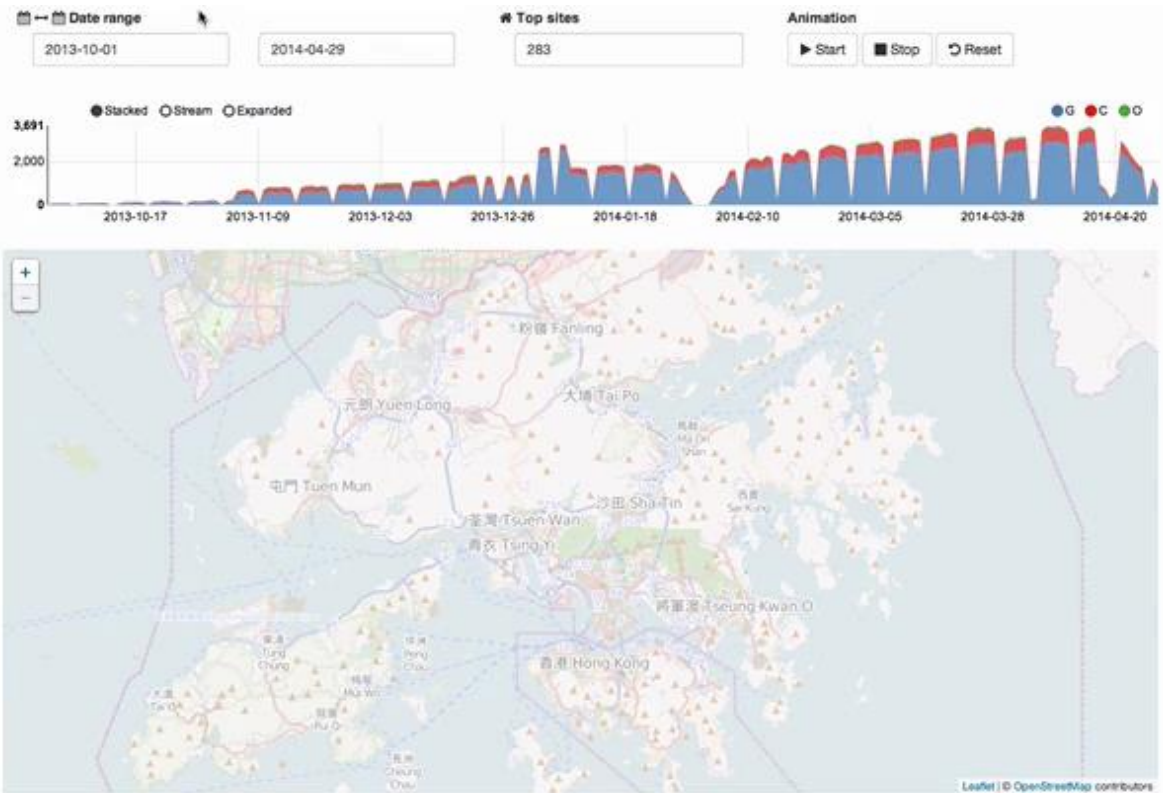


Mobile Apps Functions



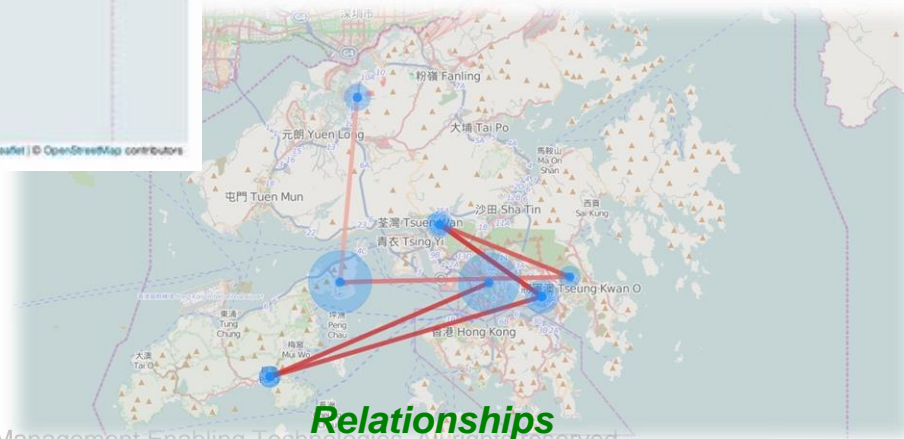


Data visualization



- ❖ **Objective :** Facilitates decision makers to see and understand analytical results
- ❖ **Technology:** Data processing, secure data communications
- ❖ **Benefits:** Identify relevance among variables; discover interesting relationships among workers behaviors

Space & Time domain



Relationships



Intelligent Future.
— 智能未來 —

Thank You