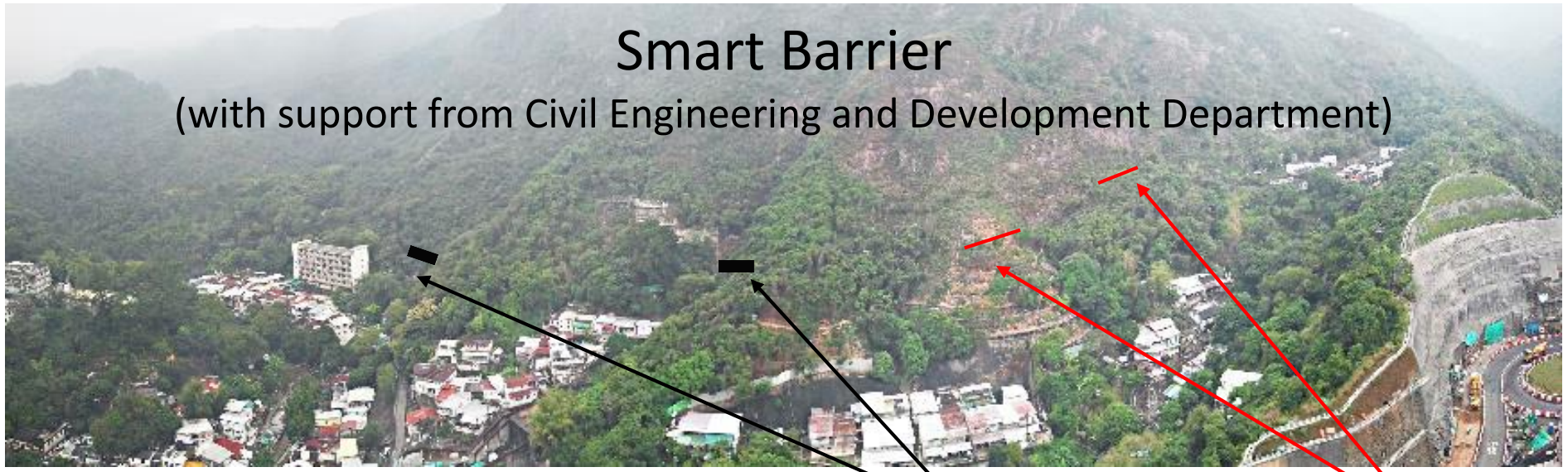
Application Challenges of IoT Deployments

Dr. CH Cheng

Director of Research and Technology Development at LSCM

Smart Barrier

(with support from Civil Engineering and Development Department)



- HK residential buildings and infrastructure are constructed near the natural hillsides
- Heavy rainstorms or seasonal typhoons imposes considerable landslide risks to the public
- Debris-resisting barriers have been built on natural hillsides to reduce the risk of landslides to safeguard the public
- No immediately notifying system on this barriers

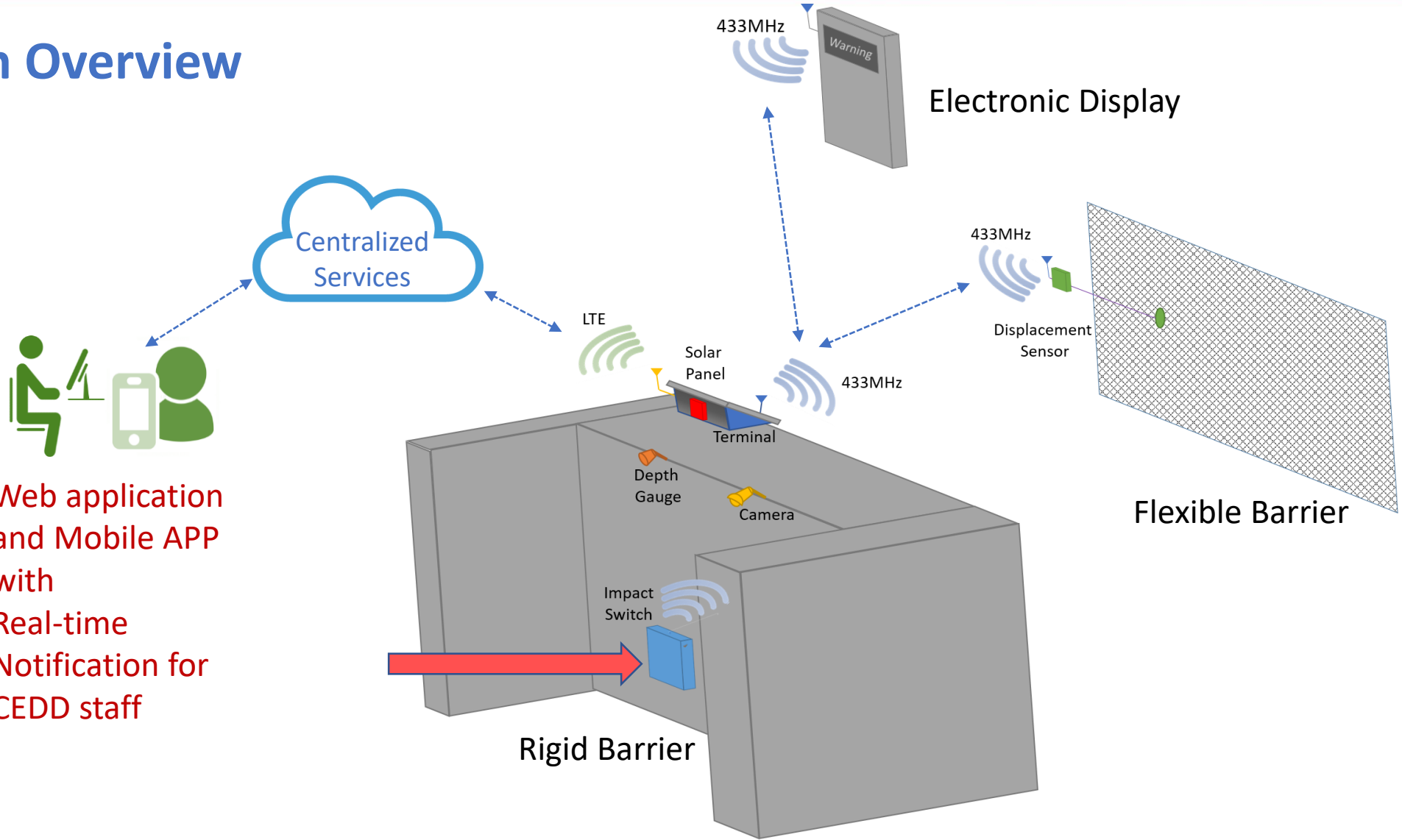
Rigid debris-resisting barrier

Flexible debris-resisting barrier

Challenges

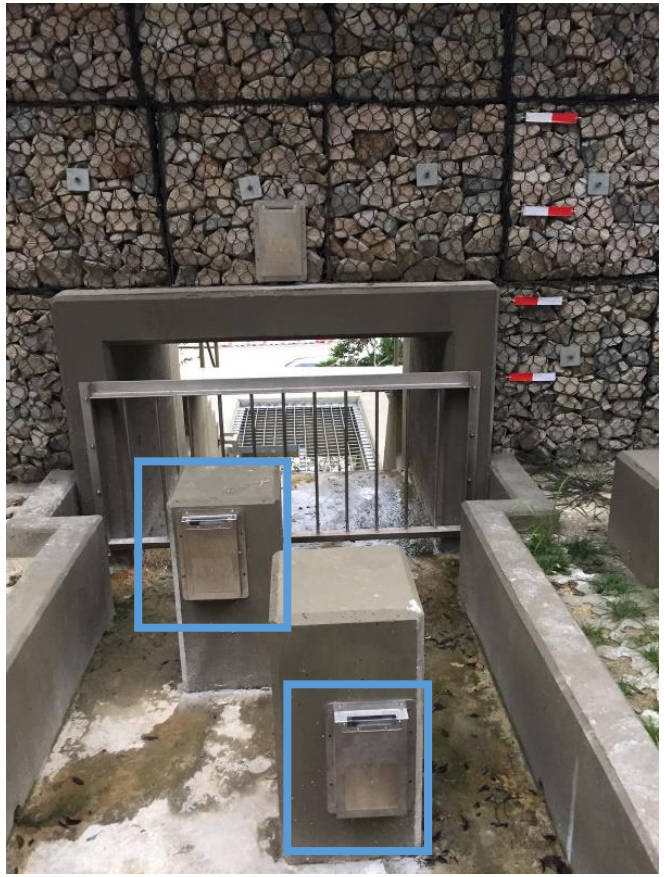
- Uninterrupted Power Supply
  - 7 days running without sun light
- Reliable Communication
  - Local wireless network & 4G Network
- Robustness
  - Long hot and rainy summer
- Simple installation
  - Steep slopes and rough terrain

System Overview



Web application and Mobile APP with Real-time Notification for CEDD staff

Rigid Barrier



Wireless Impact Switch

Solar Powered Terminal

Camera

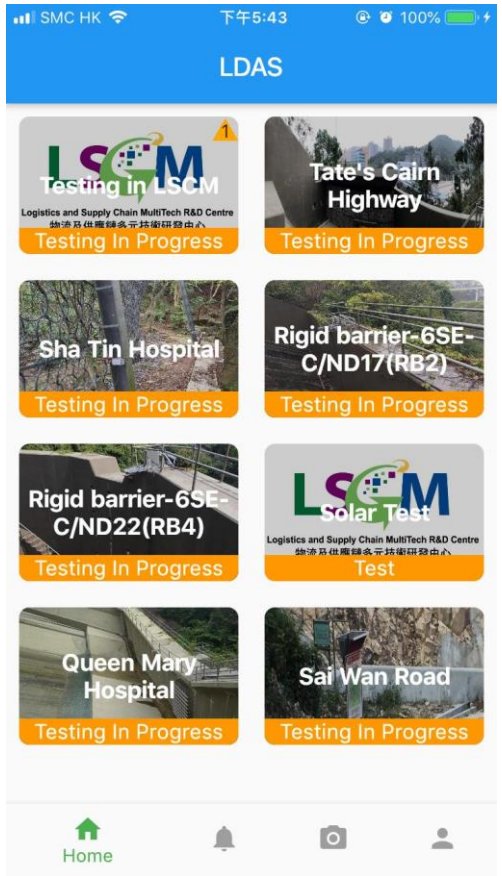
Depth Gauge

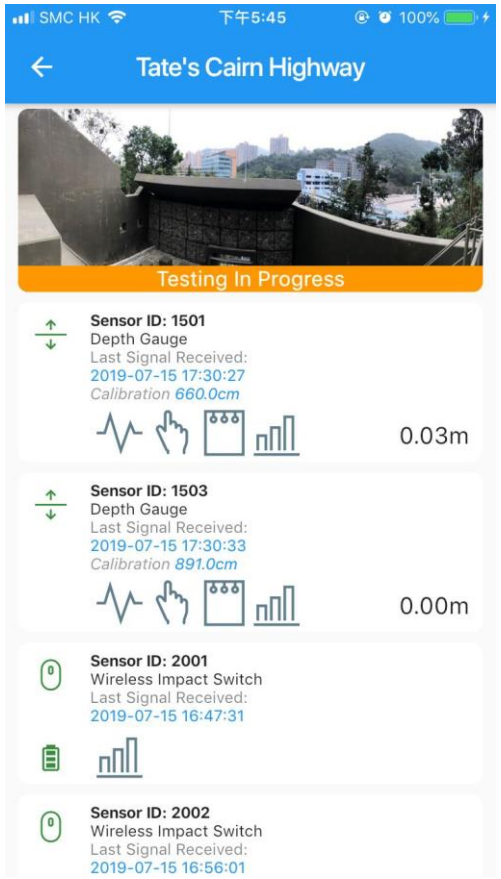
Moving Message Display

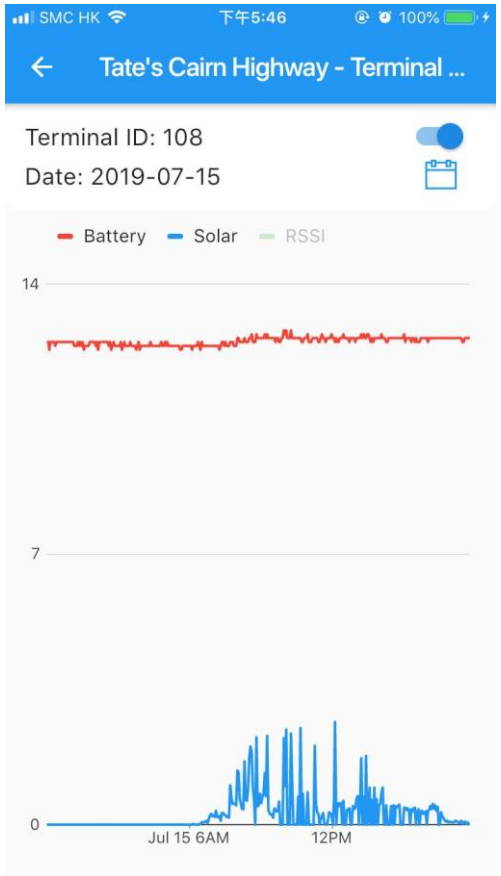
Flexible Barrier

Displacement Sensor

Camera & Terminal







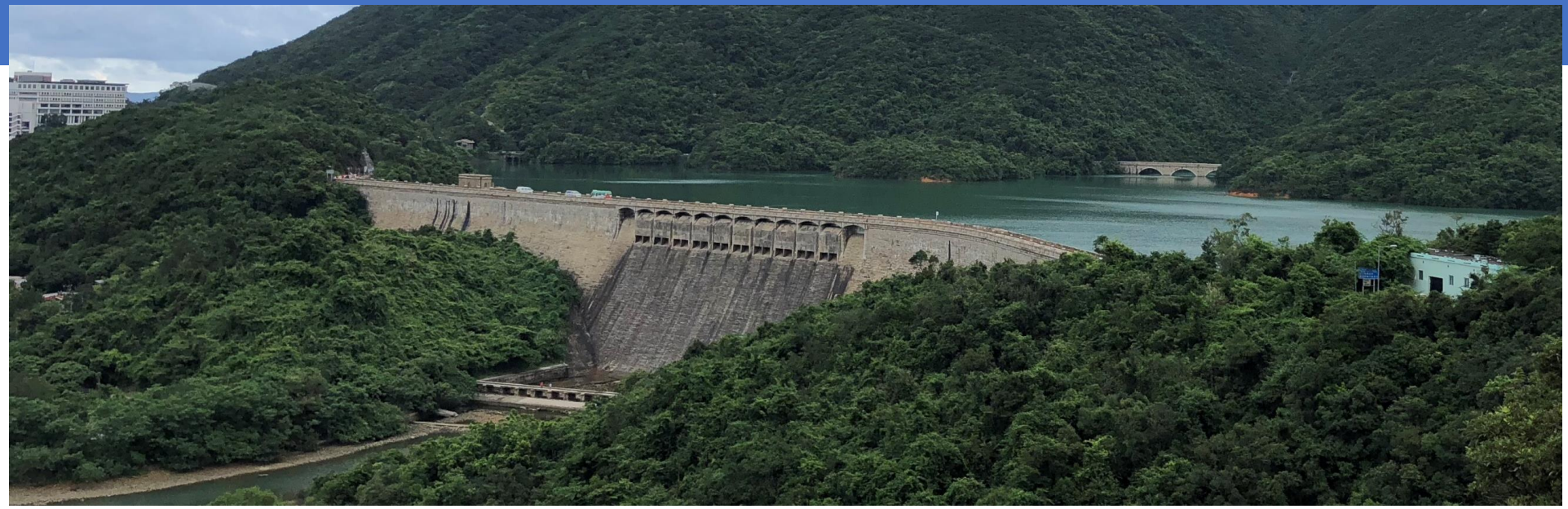
Mobile APP Android / IOS

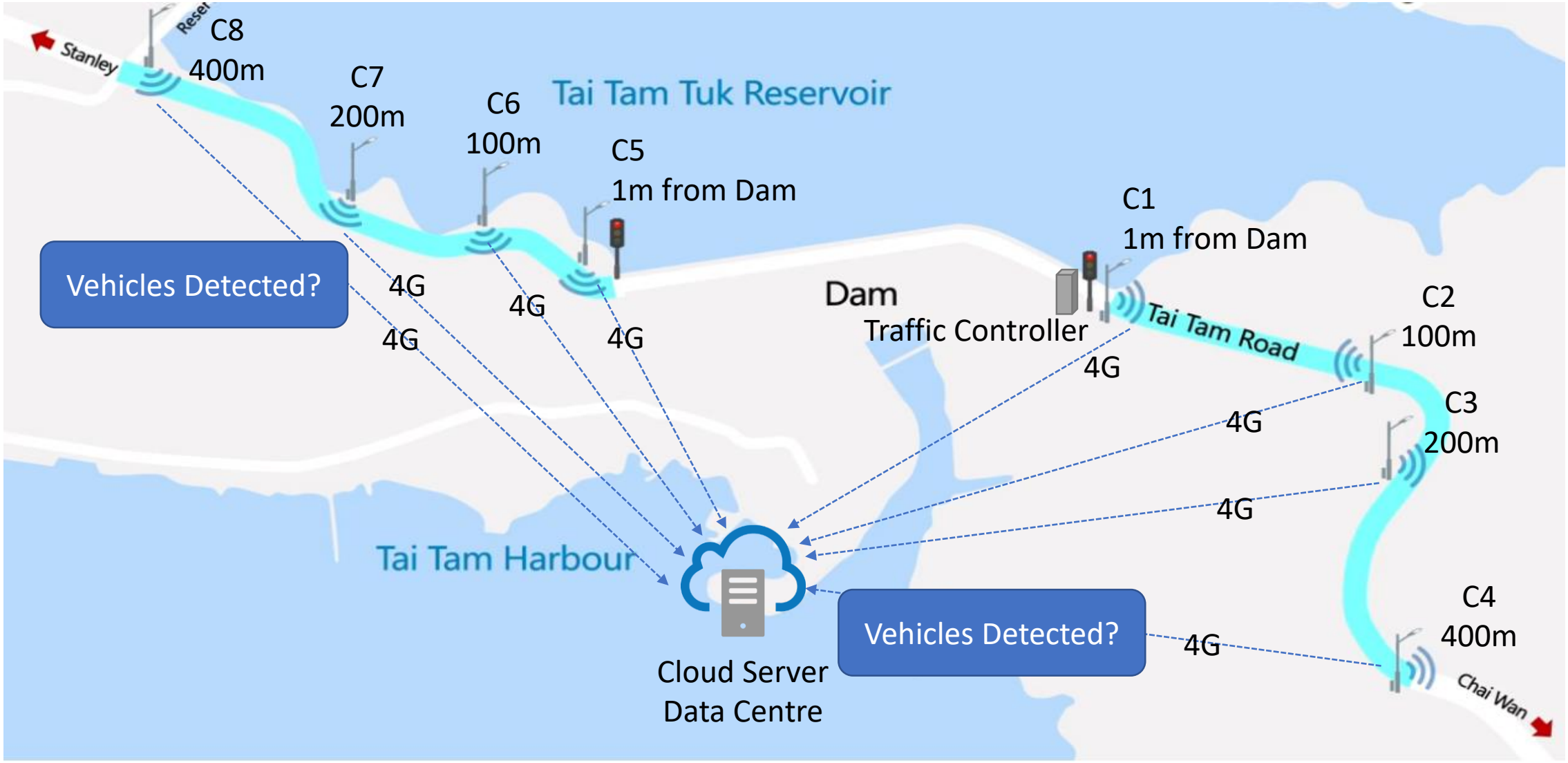
Battery status for each sensor
Charging status for solar panel devices
Heartbeat status

Smart Traffic Control System

(with support from Transport Department)

- Attempt to address a long-standing traffic problem at Tai Tam Road (Dam Section)
- Intelligently control traffic light to improve road safety and increase traffic flow

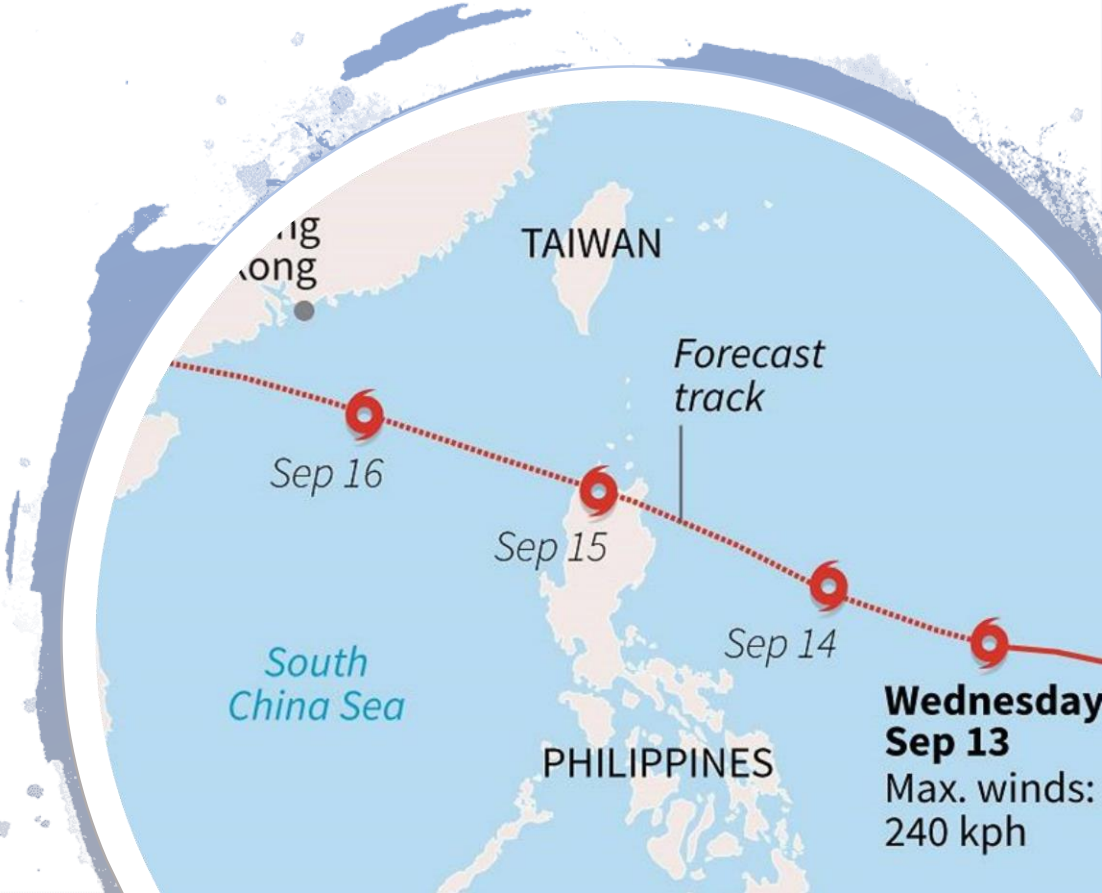



Stanley
C8
400m
C7
200m
C6
100m
C5
1m from Dam
Tai Tam Tuk Reservoir
Vehicles Detected?
4G
4G
4G
Dam
Traffic Controller
C1
1m from Dam
4G
Tai Tam Road
C2
100m
C3
200m
4G
4G
Tai Tam Harbour
Cloud Server
Data Centre
Vehicles Detected?
4G
C4
400m
Chai Wan

Challenges

Mangkhut (山竹)
2018

- Seamless Integration with the existing traffic control
- Reliable Communication
- Privacy Guarantee
- Uninterrupted Power Supply
  - Rechargeable Battery
  - 3 days running without electricity
- Functioning under extreme weather conditions



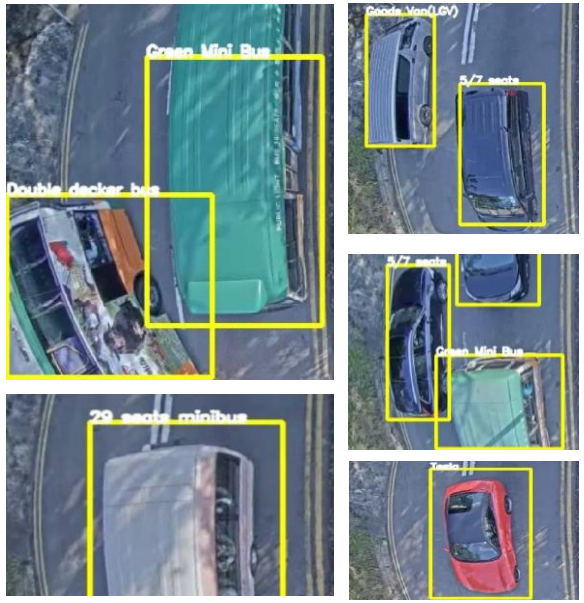
AUG
25

Operational since 25 Aug 2018

	Conventional Traffic Signal	Smart Traffic Control
Average time required to pass the dam	400s	155s

Edge Computing

- Vertical view is used
- Detection is done locally at the site
- Only numbers are transmitted for calculation

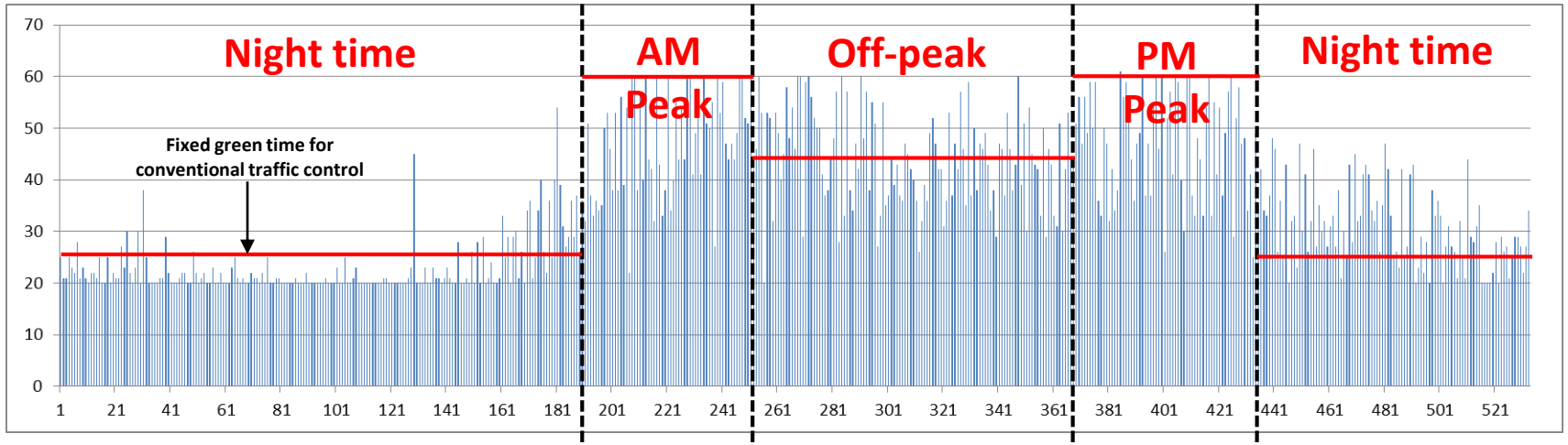


Camera mounted on lampposts

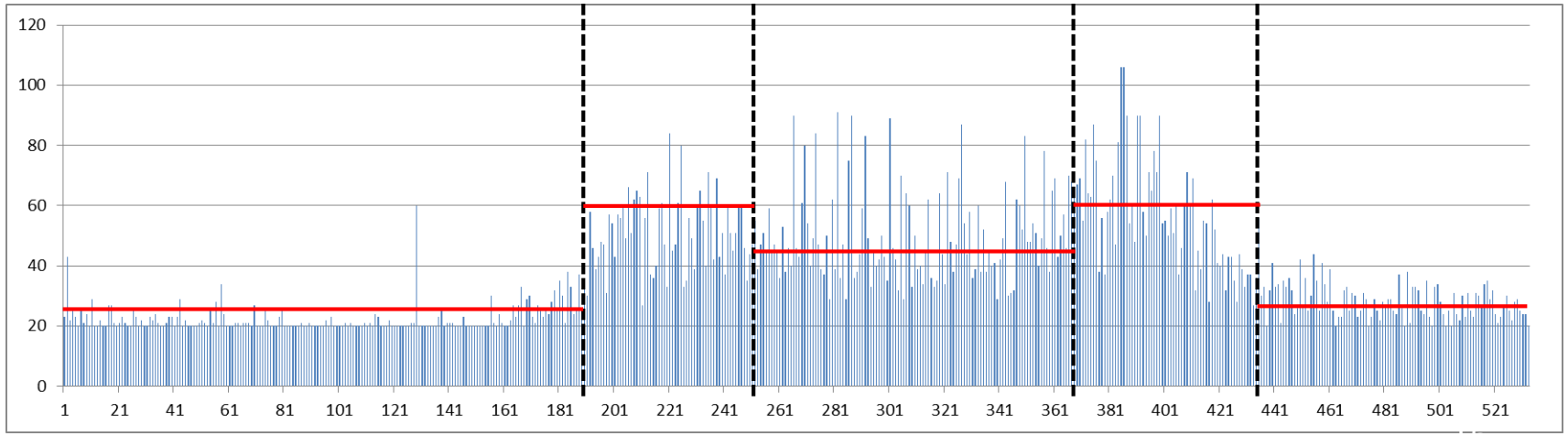
Detection unit

Dynamic adjustment of green time – actual data of 3 January 2019 (Thu)

S/B
Length of green time (sec)



N/B
Length of green time (sec)



LSCM LOGISTICS SUMMIT 2019 物流高峰會

The Pivotal Role of Hong Kong in the Greater Bay Area 物流新科研創建大灣區

政府新聞網
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特寫：https://bit.ly/2E8qA6K

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希望盡快配合埋行人斑馬線實行到各區
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