

## “Cross Industrial IoT Application”



### **Presentation summary:**

1. RFID-based applications
2. Sensor-based e-lock application
3. LBS/RTLS applications with DGPS corrected data

### **1. RFID-based applications**

The Hong Kong R&D Centre for Logistics and Supply Chain Management (LSCM R&D Centre) has worked with the Centre for Food Safety for several RFID (radio-frequency identification) technology cases. One of the most well known applications is live pig supervision between Guangdong and Hong Kong. By using embedded RFID ear tags, barcode, and cross-boundary information service platform, source tracking/monitoring as well as local delivery tracking is enhanced along the supply chain from the point of farm raising to pre-packing at supermarkets, ultimately ensuring food safety and source reliability.

Similar technology is applied on the Shenzhen-Hong Kong food safety and supply chain public information platform. With the help of RFID and barcode tagging as well as low-cost GPS and sensors, data regarding vegetable source and logistics between Shenzhen and Hong Kong is disclosed to stakeholders and the public, thus improving data transparency.

UHF (ultra-high frequency) RFID reader and UHF tag design are also used as a smart warehouse add-on to enhance anti-counterfeiting for high-end product by enabling authenticity check and securing private certification storage. Wine industry is one of

the most common users of such application.

## **2. Sensor-based e-lock application**

Under Hong Kong Customs' Intermodal Transshipment Facilitation Scheme (ITFS), a single e-lock is applied to monitor and safeguard the security of the transshipment cargo, which reduces duplicate inspection on the same shipment by Customs authorities in the exporting and importing destinations, ultimately streamlining clearance processes at boundaries and expediting the flow of transshipment cargo.

## **3. LBS/RTLS applications with DGPS corrected data**

Thanks to the Differential GPS (DGPS) corrected data which is transferred from reference station and server to mobile phone or other connected device, real-time GPS signals are improved from 4.1m to 0.4m of accuracy, favouring the below public and private location-based services (LBS) or real-time locating services (RTLS):

The Hong Kong International Airport (HKIA) deploys LBS with Wi-Fi fingerprinting, map matching, and inertial measurement to help visitors find their ways in the airport area. Video analytics, such as machine learning and pattern recognition, is also applied for timely and effective resources planning, especially on queuing and trolley availability management.

Active RFID is another commonly used technology for real-time indoor positioning. For example, the Hongkong Post uses a specially designed indoor antenna and RFID tag to track the exact position of parcels, saving time and resources to find particular parcels and reducing delays of delivery in case of parcel lost.

Regarding smart warehouse, Zigbee is applied to enable multiple sensing network to plug-and-play within interchangeable sensors with one simple switch. The application is especially beneficial to small and crowded warehouse owners in Hong Kong.

As for public services, smart drainage system is applied with RF communication, antenna network, and sensors to monitor real-time water level, hazardous gas level,

and illegal opening of manhole, eventually providing preventive maintenance and real-time alert for pedestrians and officials of the Drainage Services Department. The system is also linked to a monitoring dashboard and native app for real-time referencing among officials.

**The end**

To learn more, please watch the presentation video at [here](#).