

# RFID 技术在集装箱运输及粤港监管服务业的应用

## Applications of RFID in Container Transportation and GD-HK Import/Export Supervision Service Industry

分论坛二：推动RFID应用创新意念，开发技术转移商机

梁俊伟 博士 Dr. David Leung

研发项目管理经理 Manager, Technology Operations

香港物流及供应链管理应用技术研发中心 HK LSCM R&D Centre

广州 • 2010年9月10日 Guangzhou • China

# LSGM RFID应用于各行各业



物流与运输



仓库管理



产品防伪



制造业



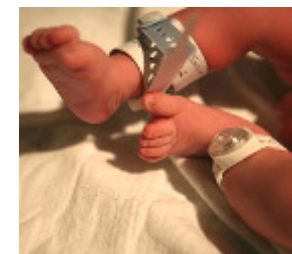
票务与人流



食品溯源



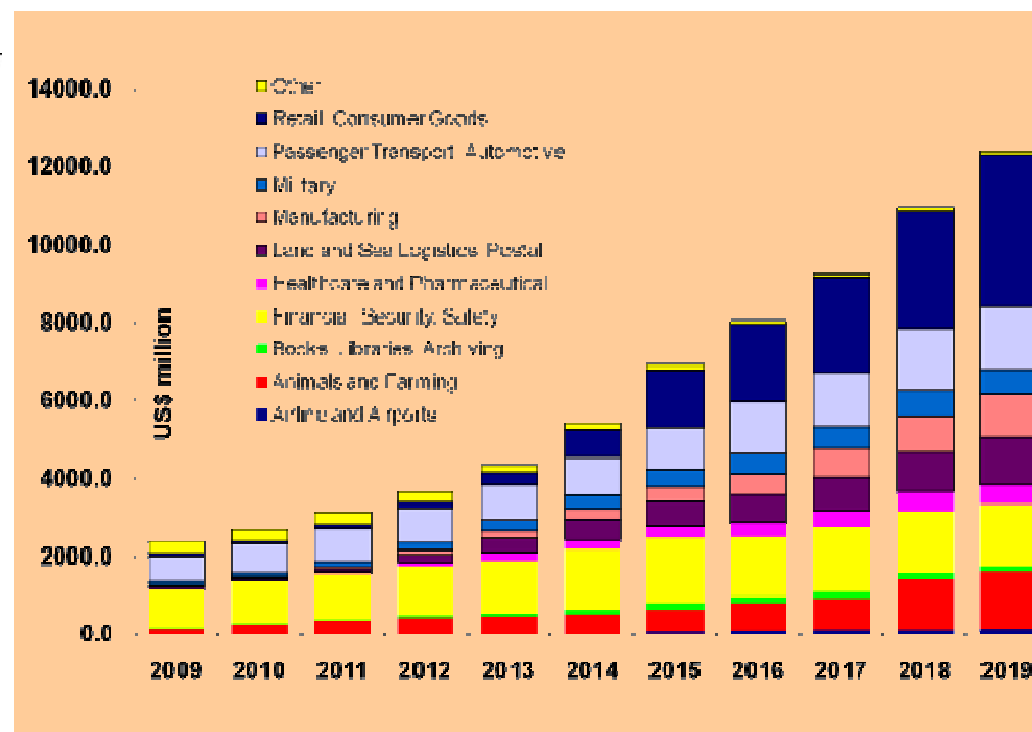
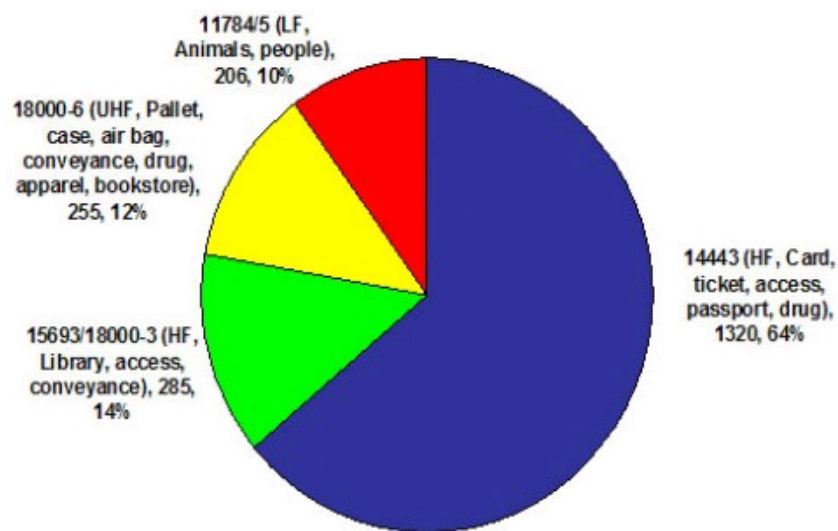
零售支付



医疗保障



根据IDTechEx 统计，RFID标签使用到2015增长超过一倍



Source: "RFID Forecasts, Players & Opportunities 2011-2021", [www.IDTechEx.com/forecasts](http://www.IDTechEx.com/forecasts)



- 成立于2006年  
Established in 2006
- 香港政府资助  
Funded by HKSAR Government
- 三所大学主持：  
Co-hosted by 3 Universities
  - 香港大学 (HKU)
  - 香港中文大学 (CUHK)
  - 香港科技大学 (HKUST)

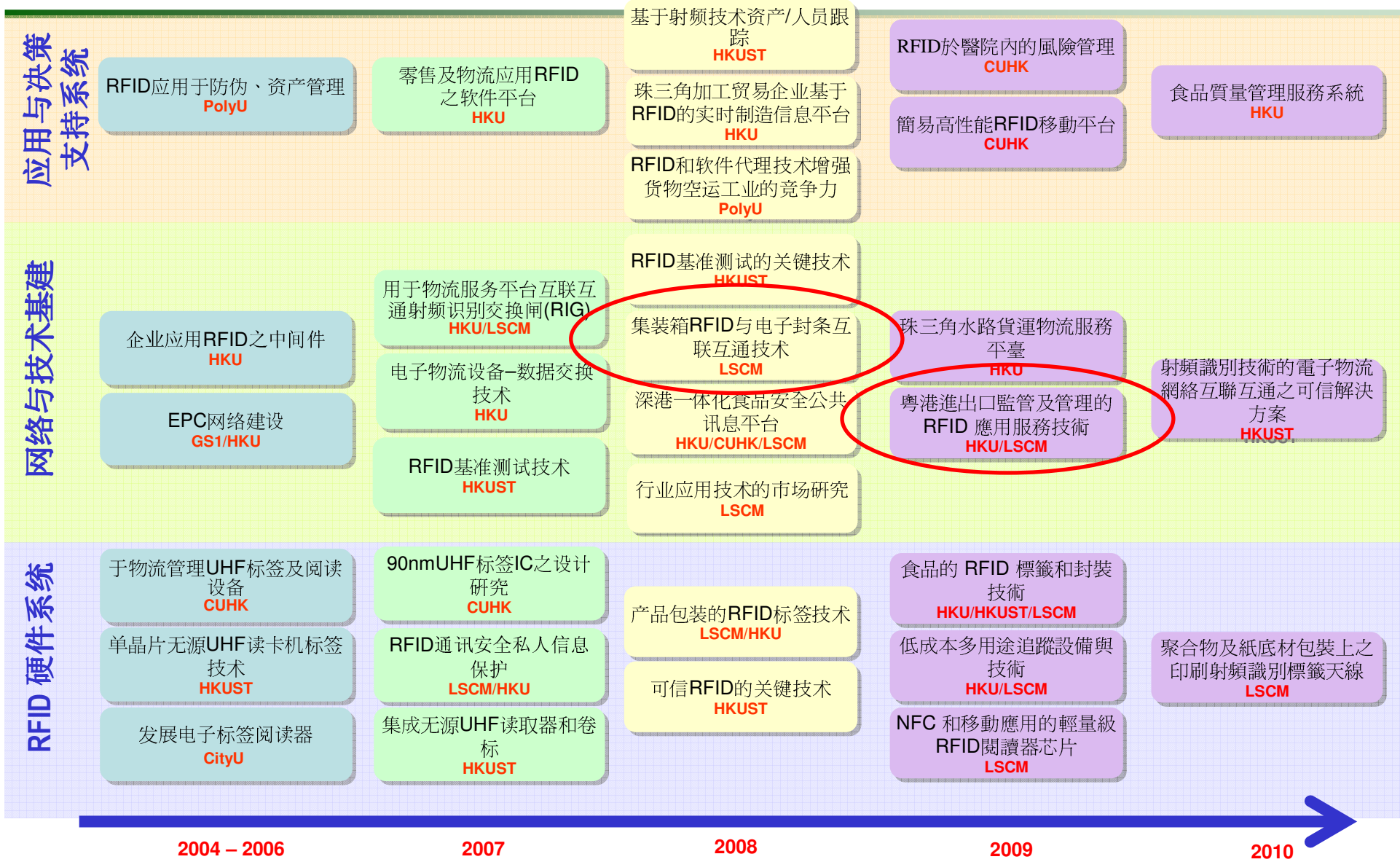
### 使命

1. 鼓励和培育技术的研究及发展  
*Incubate technology R&D and talents*
2. 作为科研成果商品化的支持中心  
*Facilitate intellectual property commercialization*
3. 促进企业应用，提升竞争力  
*Promote adoption, enhance industry competitiveness*




# LSCM 技术研发路线图

## R&D Roadmap







研发项目介绍及相关应用

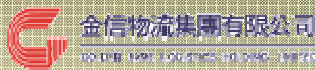
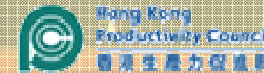




# 集裝箱電子標籤與電子封條互聯互通技術 Interoperability Technology and Applications for Container RFID and e-Seal



- 深港合作項目（2008 - 現在）
- 集裝箱在供應鏈下的信息可視化
  - 提供貨物的位置與安全信息
  - 實現供應鏈透明化
  - 提升現代物流服務水平



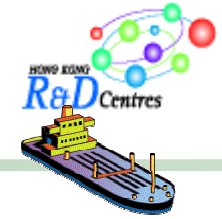
- 集装箱智能化是全球贸易发展趋势
  - 每年货品损失额达30 - 50亿美金
  - 全球反恐意识增强
- 智能集装箱可协助物流行业优化管理，提升服务水平
  - 顾客要求供应链全程可视化
  - 减少集装箱空置率







# 互连互通系统架构图



China

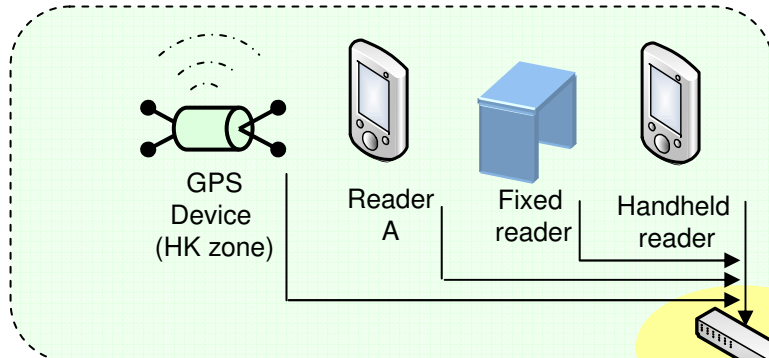
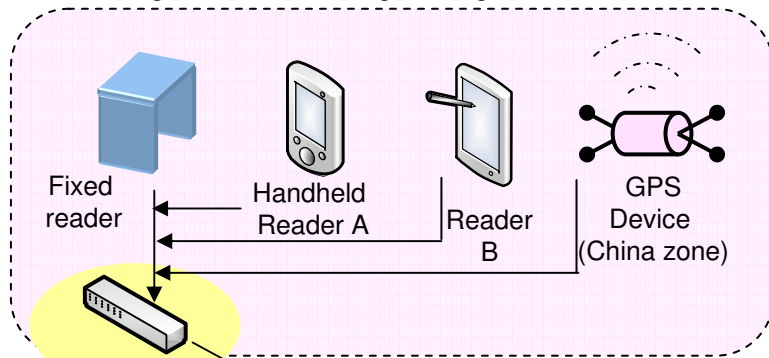
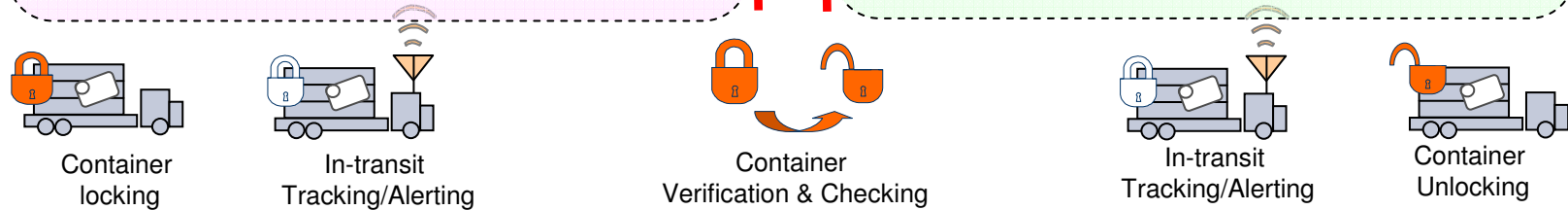
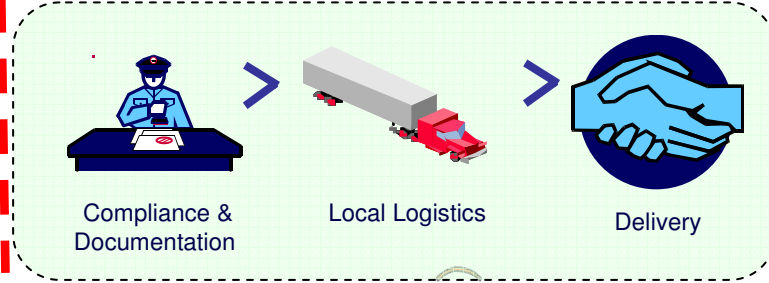
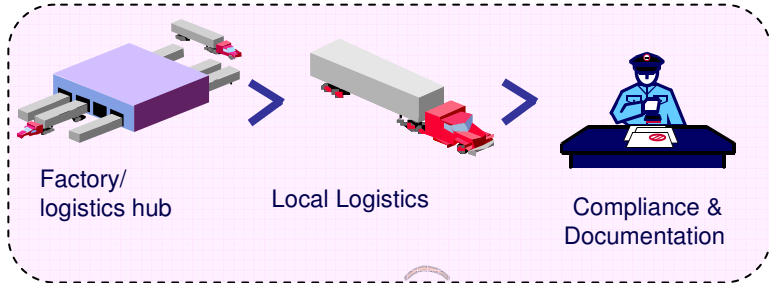
Borders

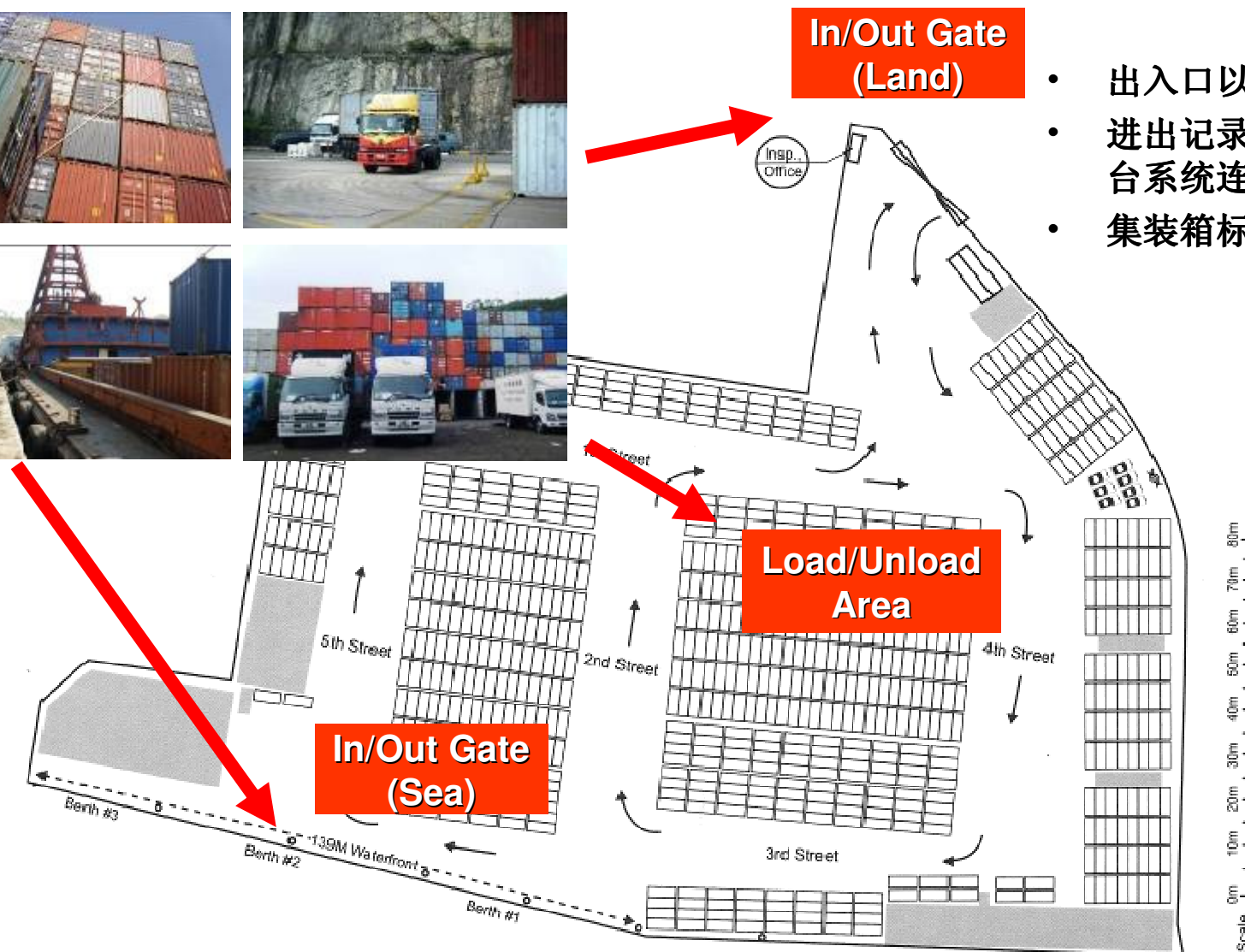
Hong Kong

Ocean Transport



Air Transport





- 出入口以人手操作为主
- 进出记录未能即时与后台系统连接
- 集装箱标示准确度



# RFID在集装箱河运码头的应用

## RFID coverage in Container Yard



**集装箱进/出场管理界面**

箱號	重吉	客戶名
TGHU2151868	拼	Testing
C2	重	

**集装箱出场1 集装箱出场2**

箱號: CLHU8825930  
 車牌號:   
 封條號:   
 備用封條:   
 運輸公司: GFS  
 箱型及材質: 40FT H/C DRY C  
 出場時間: 09/08/09, 12:50  
 出場方式: L001

**費用表**

項目	金額
運費	\$40
附加費	\$100
總費用	\$140

**附加費表**

項目	金額
附加費紅色封條	\$100
附加費黃色封條	\$100

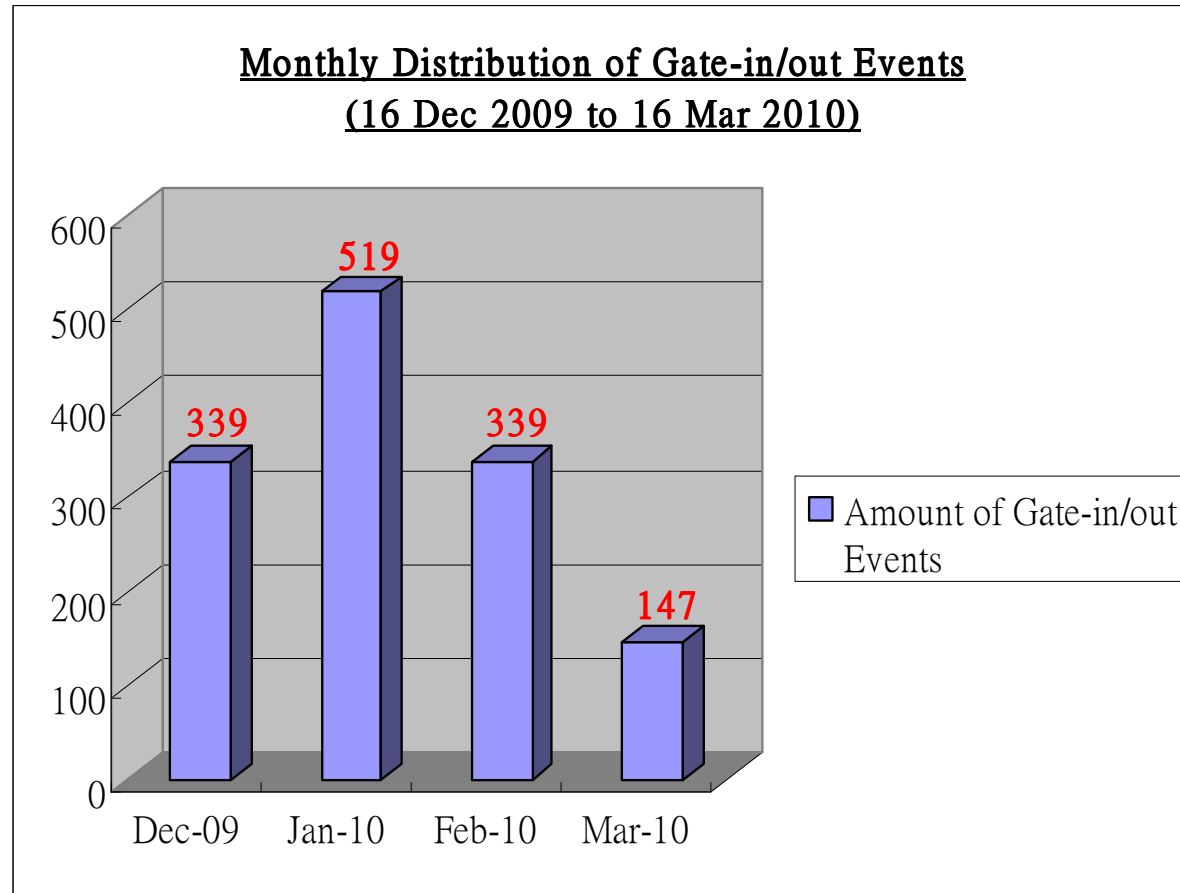
**金信船務有限公司 GOLDEN FAME SHIPPING LIMITED**

船號	船名	日期	方式	客戶名	貨品名稱	船名	船號	貨品名稱	船名	船號
982718751	金信	2009-08-08 00:00:00	DEL	DEL	DEL	DEL	DEL	DEL	DEL	DEL
TGHU2151868	金信	2009-08-08 00:00:00	DEL	DEL	DEL	DEL	DEL	DEL	DEL	DEL
TGHU2151868	金信	2009-08-08 00:00:00	DEL	DEL	DEL	DEL	DEL	DEL	DEL	DEL

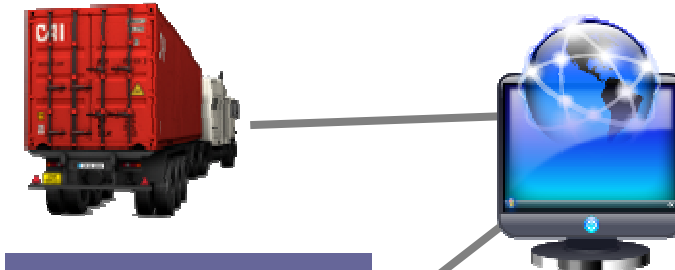
**RFID Coverage Legend:**

- WLAN Access Point
- WLAN RFID Reader
- PoE Switch
- Battery
- RFID Coverage





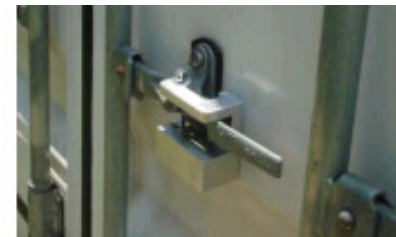
- 通过RFID, GPS, GIS, GPRS和其他尖端网络通讯技术实现
- 提升集装箱层面的安全性, 转运监测, 资产管理等
- 由很多用户参与和推动, 形成相应的标准



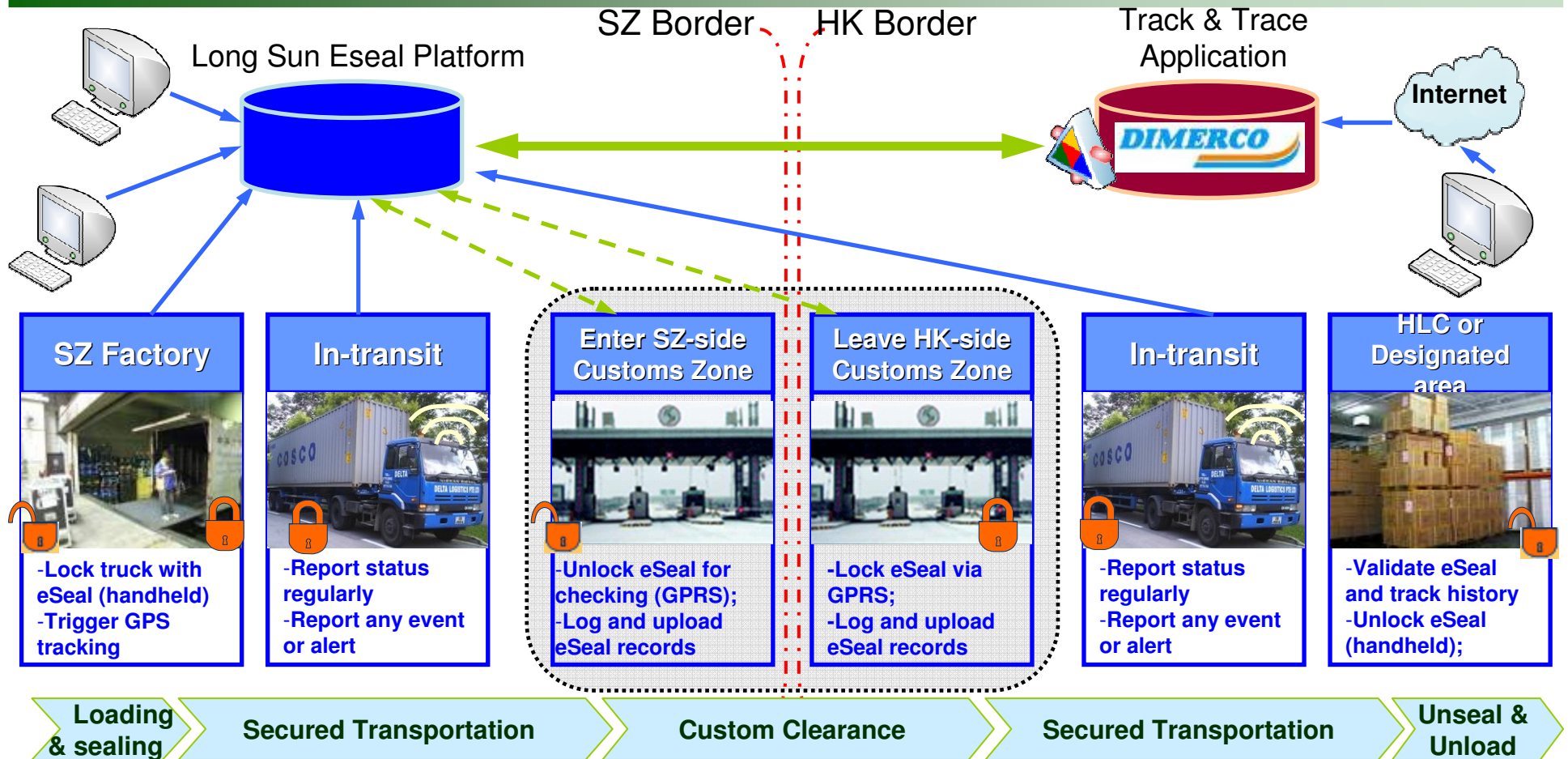
转运监测



安全控制



eSeal



**SZ Factory**

- Lock truck with eSeal (handheld)
- Trigger GPS tracking

**In-transit**

- Report status regularly
- Report any event or alert

**Enter SZ-side Customs Zone**

- Unlock eSeal for checking (GPRS);
- Log and upload eSeal records

**Leave HK-side Customs Zone**

- Lock eSeal via GPRS;
- Log and upload eSeal records

**In-transit**

- Report status regularly
- Report any event or alert

**HLC or Designated area**

- Validate eSeal and track history
- Unlock eSeal (handheld);






# 中菲行的应用演示—跨境安全物流


## Dimerco Pilot – Cross-Border Secure Logistics





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

Pilot Application for



Home Track and Trace Secure Zone System Logout

▶ Reported E-Seal

▼ E-Seal Routes

Start From  To

**MT3895** 1 - 1


Start Time	Departure/Destination
<a href="#">9/9/09 1:24 PM</a>	Lianhua Rd, Futian, Shenzhen, Guangdong, China -> 23208 Glenbrook St, St Clair Shores, Michigan, USA

▼ E-Seal Activity

Show All Activity  Hide In transit Activity

**MT3895** 1 - 10

Reported	Activity	Location
<a href="#">9/9/09 2:26 PM</a>	Mechanical Locked (E-lock Opened)	Kwai Chung, Hong Kong
<a href="#">9/9/09 2:26 PM</a>	In transit	Kwai Chung, Hong Kong
<a href="#">9/9/09 2:24 PM</a>	In transit	Tsing Kwai Hwy, Hong Kong
<a href="#">9/9/09 2:23 PM</a>	In transit	Kwai Chung Interchange, Kwai Chung, Hong Kong
<a href="#">9/9/09 2:21 PM</a>	In transit	65 Container Port Rd, Kwai Chung, Hong Kong
<a href="#">9/9/09 2:20 PM</a>	In transit	Tsuen Wan Rd, Tsuen Wan, Hong Kong



The map displays a route starting from Futian, Shenzhen, Guangdong, China, heading south through the border area into Kwai Chung, Hong Kong. The route continues through various roads in Hong Kong, including Tsing Kwai Hwy and Kwai Chung Interchange, before heading towards the coast. A truck icon is shown at the current location on the map.



# 交换闸控制界面

## Interoperable Gateway Control Interface



Current location: lscm.hk/Demo/Geofencing Lock Unlock Alert

File View Help

event.xml - Notepad

```
<event>
  <eventId>1</eventId>
  <routeNo>1</routeNo>

  <route>
    <routeNo>1</routeNo>
    <lockNo>90324002</lockNo>
    <vehicleNo>MX2001</vehicleNo>
    <vendorProperty>
      <property>
        <name>password</name>
        <value>0123456789</value>
      </property>
    </vendorProperty>
  </route>

  <eventTime>2010-08-10T15:00:00</eventTime>
  <receivedTime>2010-08-10T15:00:00</receivedTime>

  <position>
    <longitude>124.08</longitude>
    <latitude>22.38</latitude>
  </position>
</event>
```

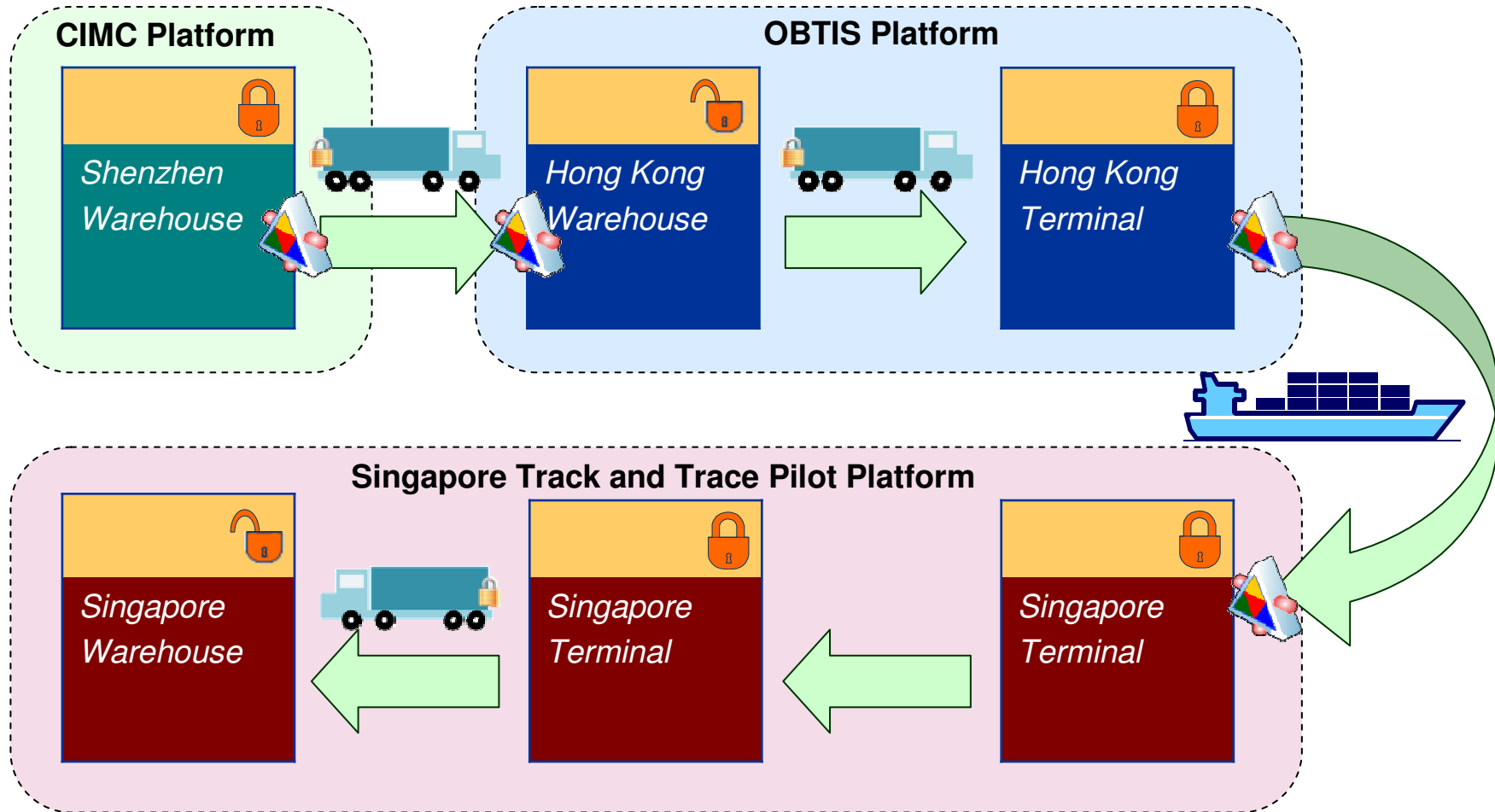
writer	LongSun LX07C Reade..
provider	SiteServer
handler.id	bill@lscm.hk
site.server	DC_GATEWAY

```
graph TD
    UZ[Unlock Zone] -- eventInstance --> GRN[Get RouteNo]
    UZ -- eventInstance --> UE[Unlock Event]
    UZ -- eventInstance --> LE[Lock Event]
    GRN --> GR[Get Route record]
    GR -- routeInstance --> UE
    UE --> UN[Unlock]
    UN -- unlockInstance --> IE[Insert Event]
    UN -- unlockInstance --> UNSA[Unlock SMS Alert]
    LE --> L[Lock]
    L -- lockInstance --> ISA[Insert Event]
    L -- lockInstance --> LSA[Lock SMS Alert]
```

**Legend**



**Interoperable Gateway by LSCM**

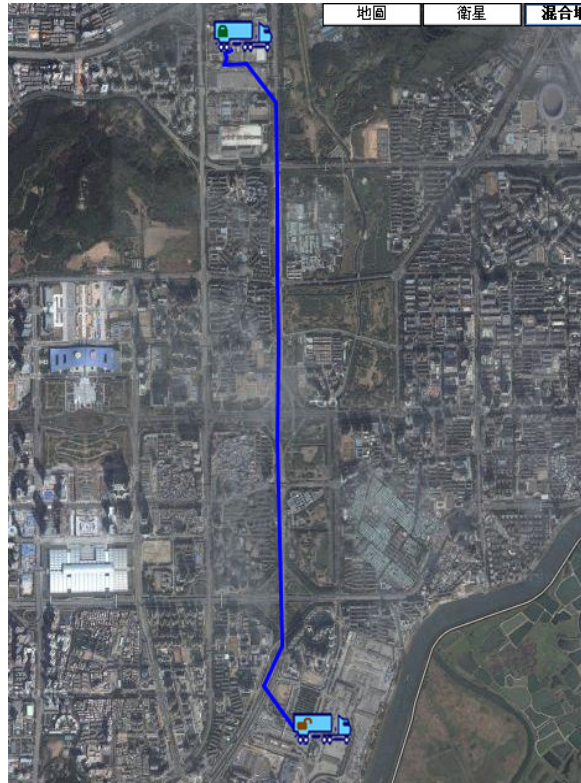






# 深圳·香港·星加坡一跨平台应用演示

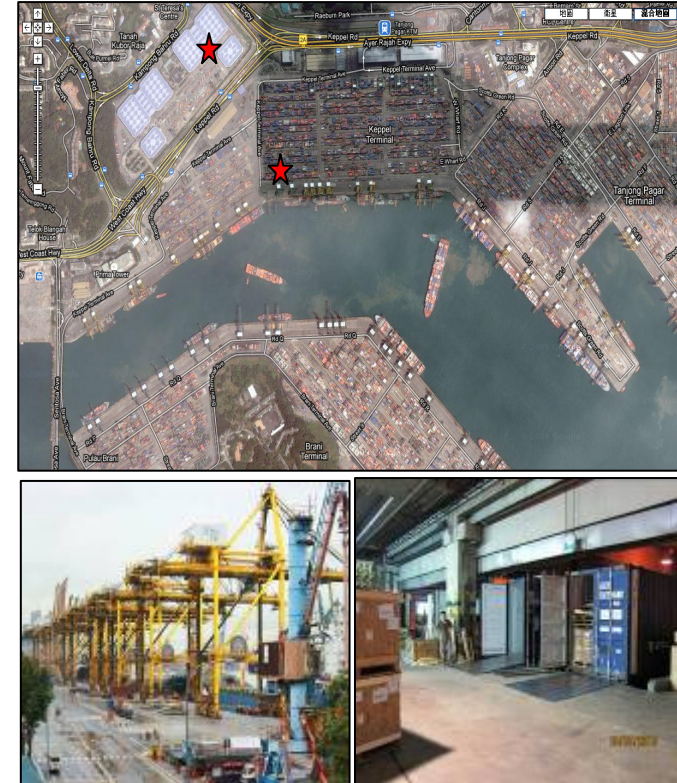
## SZ-HK-SG Cross Platform Piloting



Armed in SZ Warehouse	2/3/10 01:21 PM
Disarmed at SZ Customs	2/3/10 03:01 PM

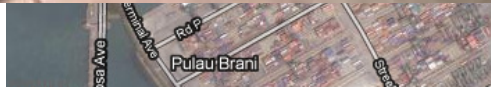


Armed at HK Customs	2/3/10 03:38 PM
Disarmed in HK Warehouse	2/3/10 04:31 PM



Singapore Keppel Terminal	19/3/10 09:04 AM
Disarmed in Singapore Warehouse	19/3/10 09:46 AM





## eSeal Report

申請: AB1234  
 期間(日期\*時間): 2010/07/09 12:00:00  
 期間(日期\*時間): 2010/07/09 20:00:00

## eSeal Report

報告日期: 2010/07/20 10:45  
 申請: AB1234  
 期間(日期\*時間): 由 2010/07/09 12:00:00 至 2010/07/09 20:00:00

時間	位置	速度 方向 向里/小時	狀態	電子鎖號碼	電子鎖警告
2010/07/09 (12:00:45)		96 0	閒置	電子鎖統計	
2010/07/09 (12:03:38)		96 33	行駛中	電子鎖統計	
2010/07/09 (12:04:53)	广东省深圳市宝安区西乡街道西乡社区西乡社区 399路	96 0	閒置	電子鎖統計	
2010/07/09 (12:06:36)		96 0	閒置	電子鎖統計	
2010/07/09 (12:07:38)		96 0	閒置	電子鎖統計	
2010/07/09 (12:11:38)		96 0	閒置	電子鎖統計	
2010/07/09 (12:12:34)		96 0	閒置	電子鎖統計	
2010/07/09 (12:14:04)	广东省深圳市宝安区西乡街道西乡社区西乡社区 401路	96 0	閒置	電子鎖統計	
2010/07/09 (12:14:58)		96 0	閒置	電子鎖統計	
2010/07/09 (12:16:48)		96 25	行駛中	電子鎖統計	
2010/07/09 (12:20:28)		96 0	閒置	電子鎖統計	
2010/07/09 (12:21:58)		96 85	行駛中	電子鎖統計	
2010/07/09 (12:22:45)		96 96	行駛中	電子鎖統計	
2010/07/09 (12:24:00)	广东省深圳市宝安区(赤岗岭路) 碧山桥门 留35米	96 92	行駛中	電子鎖統計	
2010/07/09 (12:25:38)		96 81	行駛中	電子鎖統計	
2010/07/09 (12:25:58)		96 74	行駛中	電子鎖統計	
2010/07/09 (12:28:15)		96 114	行駛中	電子鎖統計	
2010/07/09 (12:29:37)		96 114	行駛中	電子鎖統計	
2010/07/09 (12:31:55)		96 92	行駛中	電子鎖統計	
2010/07/09 (12:33:37)		96 0	閒置	電子鎖統計	

249 items found, displaying 1 to 20 [First Prev] 1, 2, 3, 4, 5, 6, 7, 8 [Next Last]

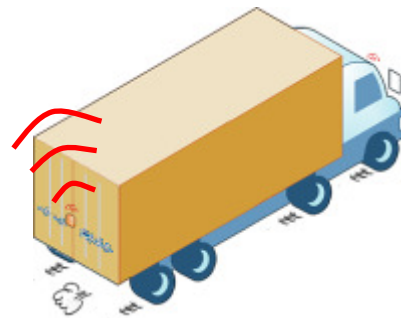
- 智能集装箱管理与追踪
  - 集装箱堆场管理系统
  - 跨境集装箱物流安全运输应用系统
  - 跨平台安全信息交换技术
  - 以电子封条为基础，完善技术以便利通关

### Manufacturer



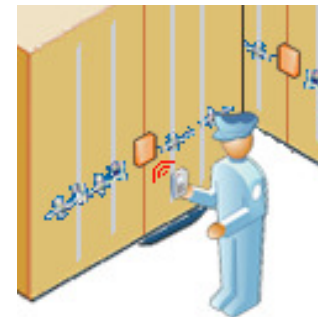
- Lock the Container with eSeal

### Transportation



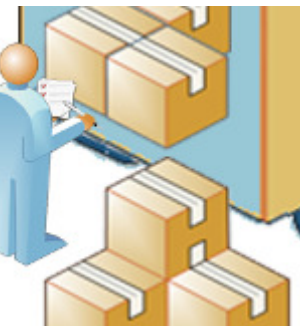
- Report eSeal status during in-transit

### Custom clearance



- Verify the container and eSeal status

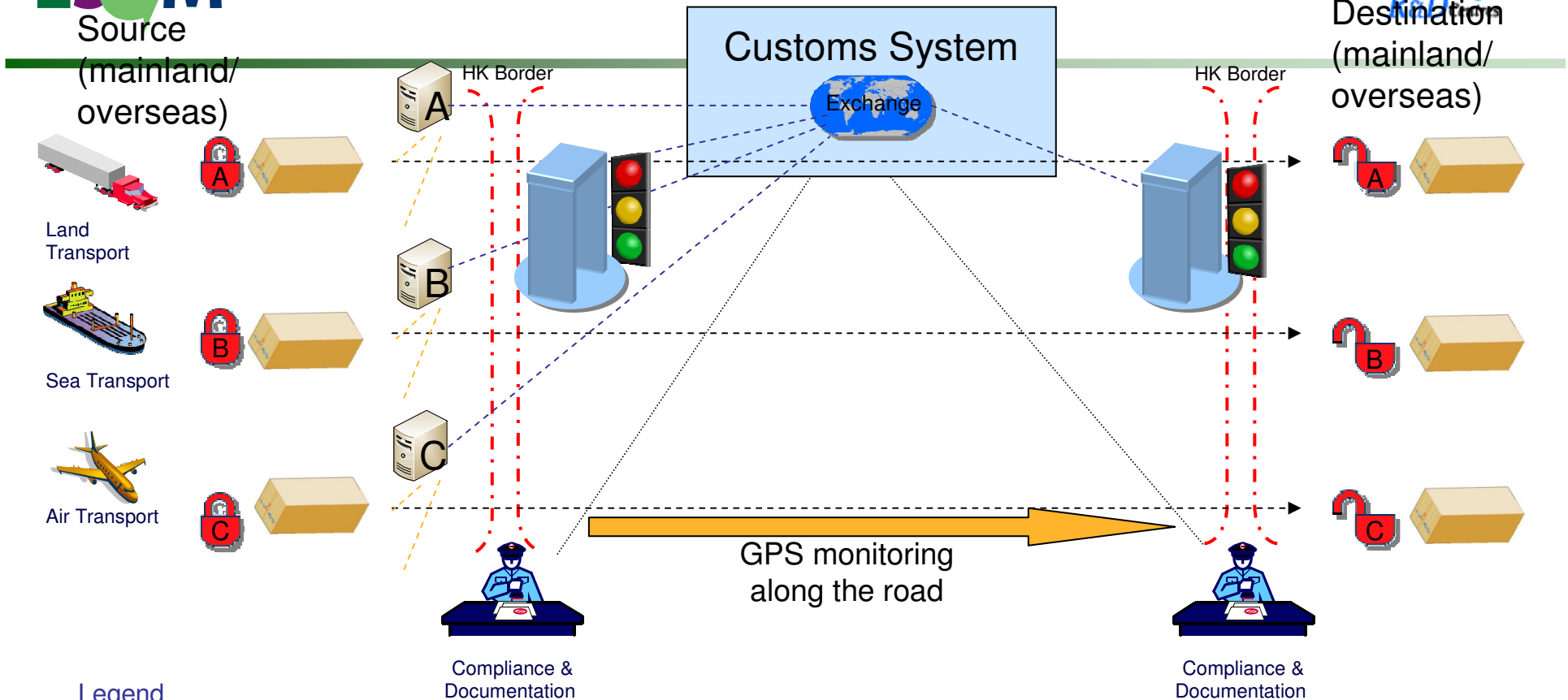
### Delivery







- Confirm delivery and payment



# Transshipment Overview



## Legend

1. E-seal Reader 
2. E-seal 
3. E-seal Information Exchange 
4. Vendor-operated tracking platform 

## Challenges :

1. Multiple e-seal service provider
2. Multiple readers, air protocols and service protocols
3. Need to trust platform and intermediate communication device



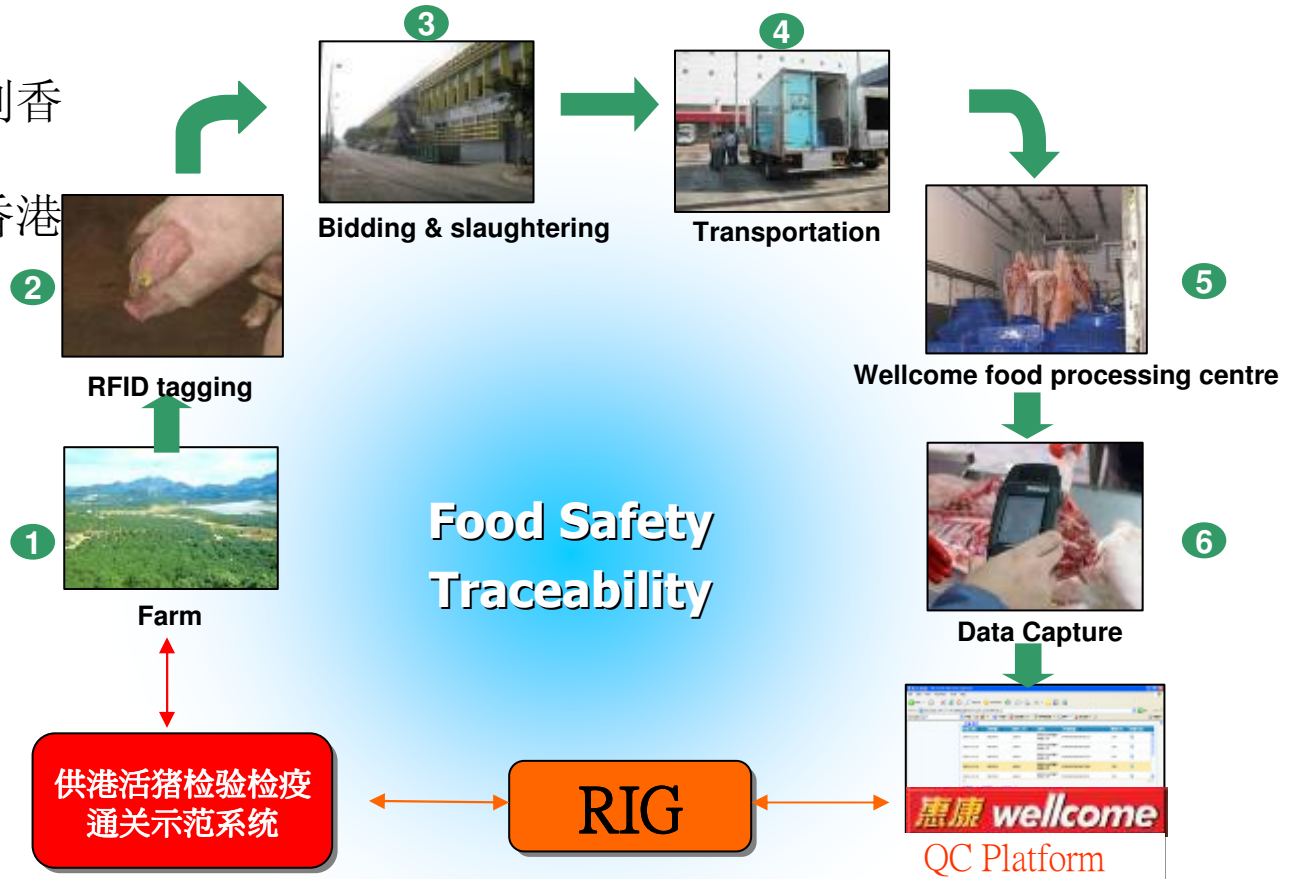
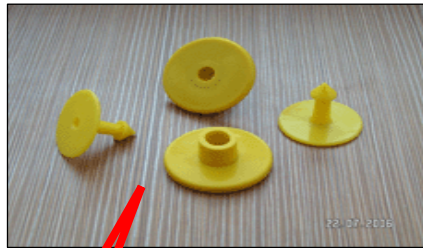
# 研发项目介绍及相关应用





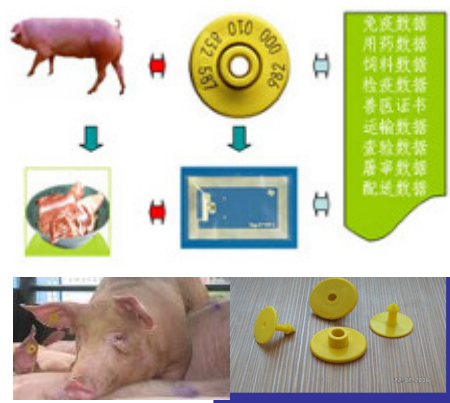
### 輸港生豬

4000生豬從內地運到香港  
70% 是從廣東運到香港



- Live pig traceability information accessible at supermarkets
- LSCM's Interoperability Gateway technology connects Guangdong live pig information platform and QC/food safety traceability application platform in HK

- GDCIQ 項目 - RFID在生豬供應鏈上的應用
- 試驗期 2005-2007
- 從農場到通關的耳標



2010/9/10



推动RFID应用创新意念，开发技术转移商机



25

- 建立在前期項目的基礎上，如耳標、固定通道閱讀器和手持閱讀器。
- 解決如下問題：
  - 改進通道閱讀器的整體設計與安裝，以應付生豬通過通道時的速度和數量要求
  - 擴展下游信息平臺到超級市場
  - 將豬肉生產綫上的環標與條碼相結合
  - 用于超市端豬肉交易接收時的質量追蹤與驗證系統

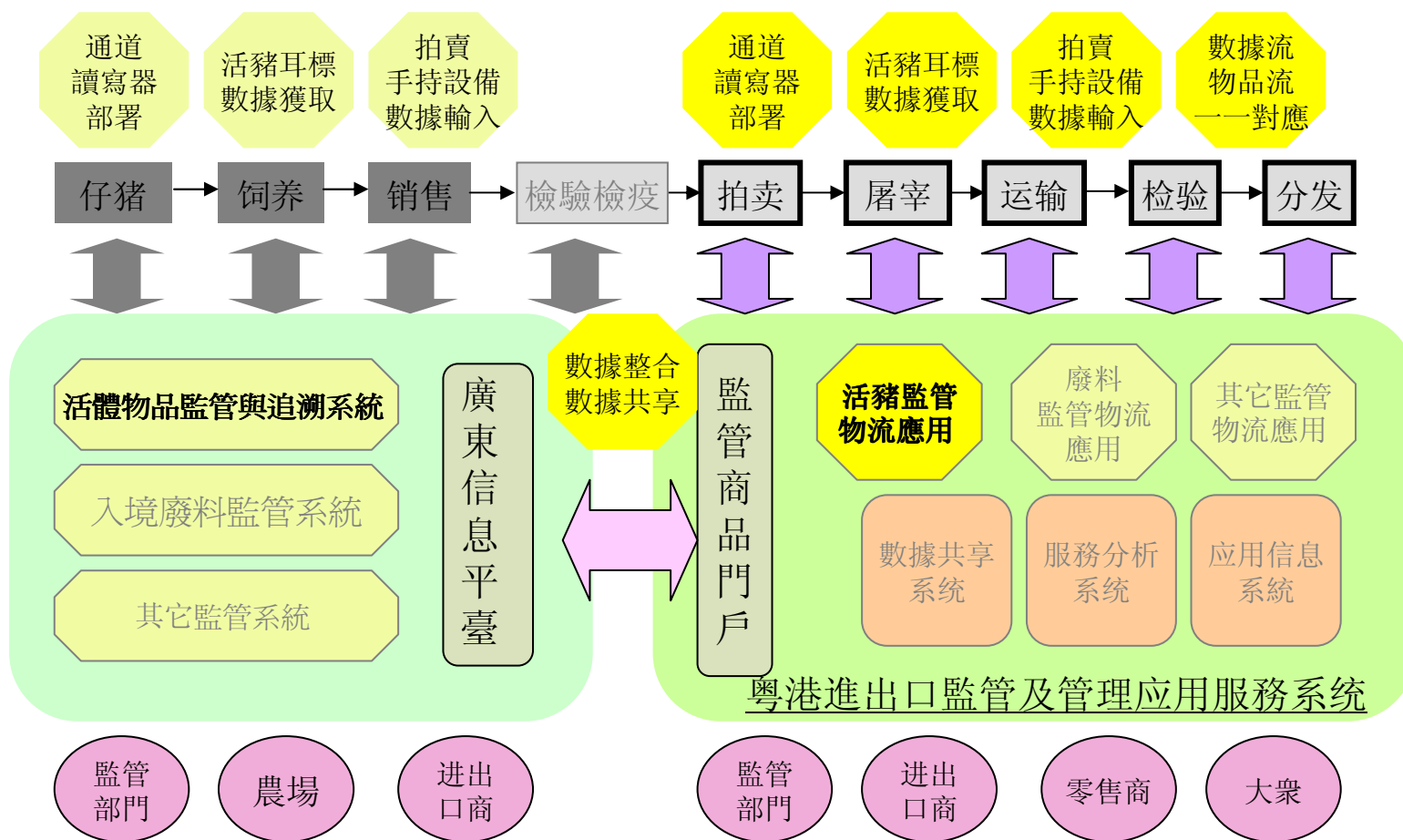


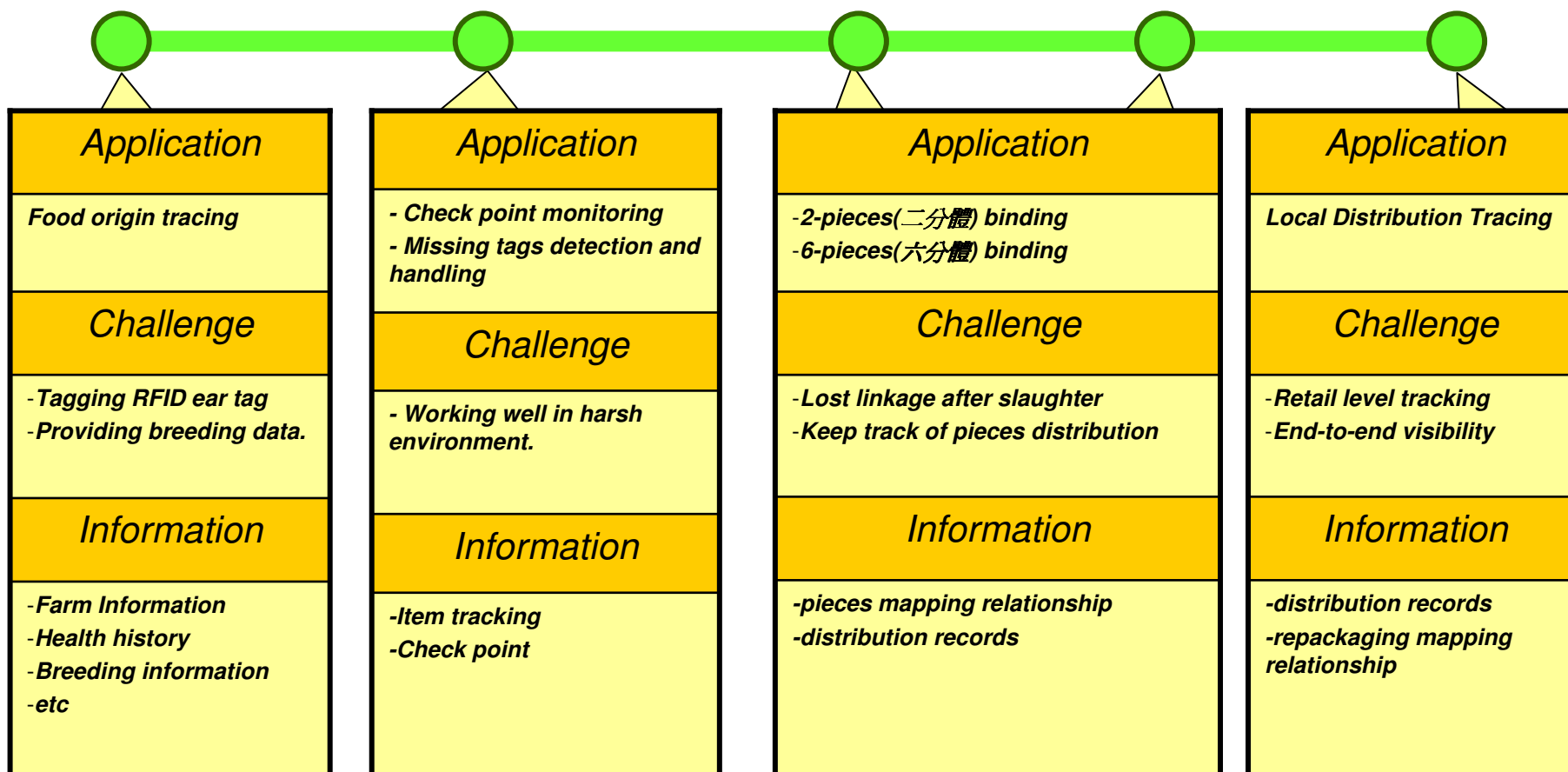
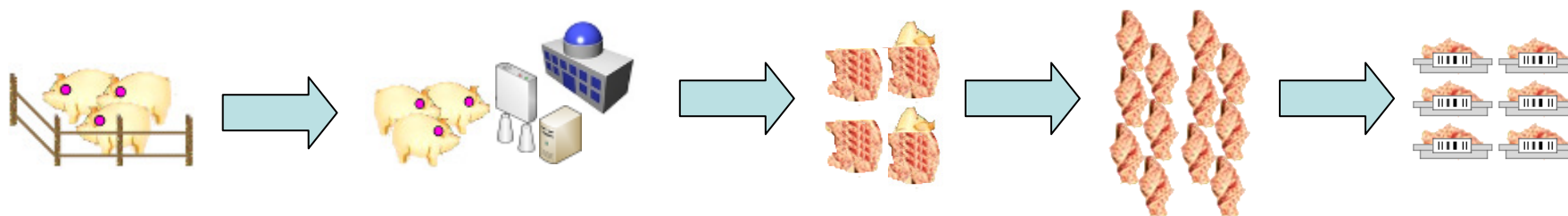
**GDH** 廣南(集團)有限公司  
GUANGNAN (HOLDINGS) LIMITED



**惠康 wellcome**

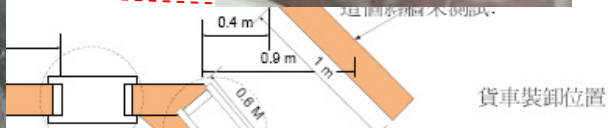




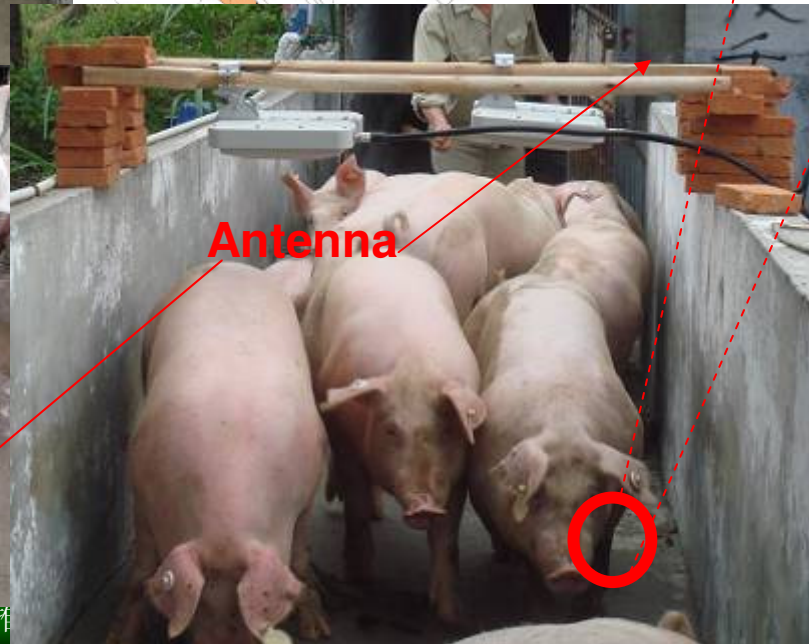
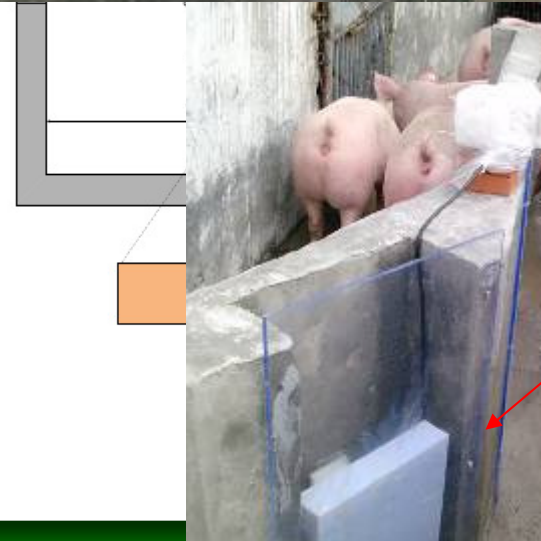




安裝一個金屬箱, 用於  
呎吋: 闊 60 Cm, 高 50  
0.9 m

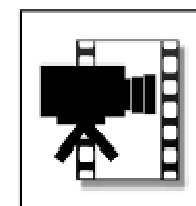
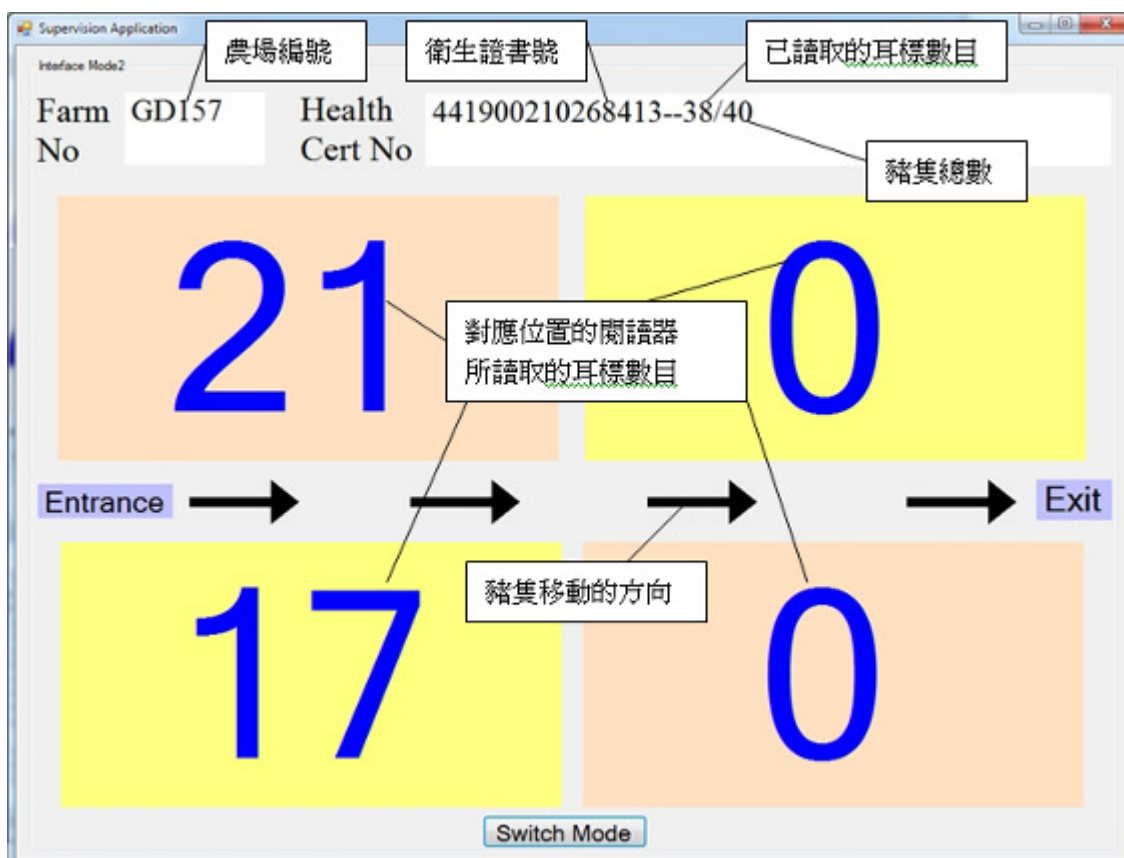


- 生豬通過通道時的速度
- 閱讀器
- UHF 裝置使用





## 屏幕设计





**谢谢大家!**

**Thank You !**

*David Leung*

*Website: [www.lscm.hk](http://www.lscm.hk)*

*Email: [dleung@lscm.hk](mailto:dleung@lscm.hk)*

