



# 实时食品品质管理系统

## Real Time Food Quality Management Service System

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# 食品安全关系公众健康

- **Food Safety, Wastage---业界主要关注:食品安全和食品损耗**  
**Two prominent issues in managing perishable food**

- **Food Safety is public concern---公众主要关注:健康**  
**HEALTH**

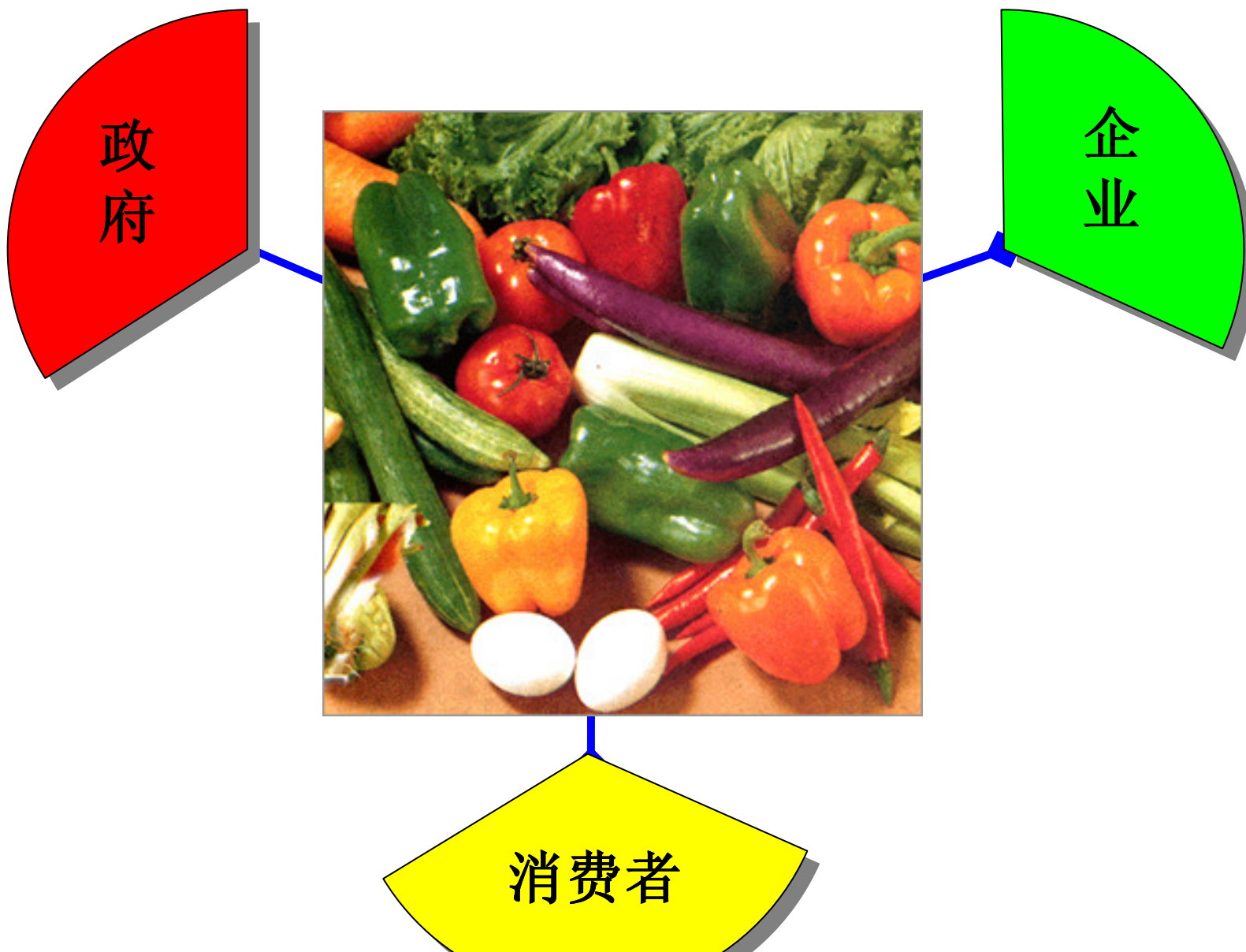
- Needs support & collaboration from:多方合作
  - ◆ Government-政府
  - ◆ Food industry-食品业界
  - ◆ Consumers-消费者



- While cold chain supports managing precise goods condition, industry still needs application services to:-业界需求
  - ◆ Efficiently guard comprised goods-有效性
  - ◆ Timely react to prevent goods being comprised-时间性
- Existing sensing monitoring is segmented and disrupted during transit  
现有模式存有不足之处



# 食品安全供应链需要各方面支持和合作





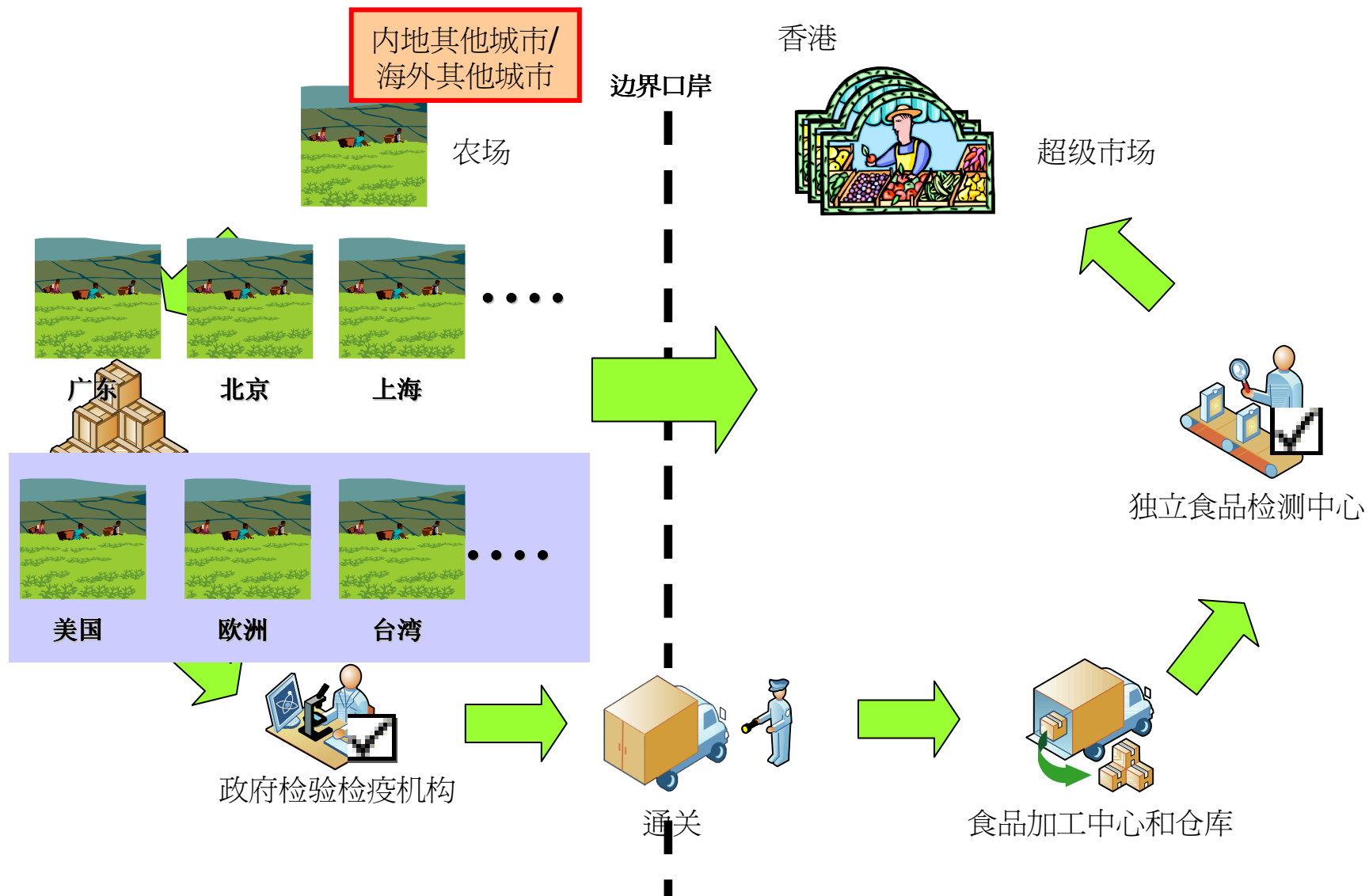
# 食品业界的主要关注点



<p>食品供应商和生产中心</p>	<p><b>No quality compromised after production- 制造后没有变质</b> Monitor监控  <i>"How can I prove or disapprove returned goods?"</i> Track and Trace追踪溯源  <i>"How can I be timely notified of potential delivery mishandling so I can react immediately?"</i> Alert预警</p>
<p>食品物流服务提供商</p>	<p><b>No problem introduced during their possessions- 运送中没有出现问题</b>  <i>"How can I minimize in-transit problem? E.g. alerting my driver of potential temperature abuse?"</i> Track and Trace追踪溯源 Monitor监控 Alert预警  <i>"How do I assure the delivery follows proper procedure?"</i> Remote Support远程支援</p>
<p>仓库, 超级市场, 餐厅等</p>	<p><b>Make sure products received are genuine and in good quality; Any action required on current stocks?- 收到合格和优质产品; 库存管理</b>  <i>"How can I know the food quality indicator during delivery? E.g. any temperature abuse in the delivery?"</i> Decision Support决策支援 Monitor监控 Alert预警  <i>"Is there tool to easily indicate if the quality of this delivery is good enough for me? Can I know if there is any temperature abuse in the delivery?"</i> Quality Indicators质量指标  <i>"Any suggestion on which cases / pallets of food is at higher risk so I have to pay more attention?"</i> Track and Trace追踪溯源 Access to Certification证明  <i>"Have all cold food that just received being transferred to the cold warehouse timely?"</i></p>
<p>消费者</p>	<p><b>Quality, safety, quality, safety.... 质量, 安全</b> Decision Support决策支持  <i>"Is the food from a quality supplier and handled by an approved qualified process?"</i> Alert预警  <i>"Is the food in good quality?"</i> Quality/Safety Related Info 质量和安全有关信息</p>



# 典型供港食品供应链





# 食品安全供应链管理相关研发项目



- **2007: LSCM & ETI developed RFID info system of live pig supply**  
(LSCM 与 ETI 合作研发供港生猪的 RFID 信息系统)
  - ◆ 国内/香港食品平台的数据互通
  - ◆ 促使惠康超市可实时提取活猪信息
  
- **2008: ETI developed Food Safety Public Info Platform**  
(ETI 研发食品安全公共信息平台)
  - ◆ 供港食品为重点
  - ◆ 开发信息平台与应用服务
  - ◆ 果蔬供应, 活猪供港
  - ◆ 食品跟踪, 溯源, 警报及回收
  
- **2009: LSCM & ETI with GDCIQ on GD-HK Live-Pigs Supervision Project**  
(LSCM 与 ETI 和广东CIQ合作研发粤港生猪监管项目)
  - ◆ 二十万猪耳标
  - ◆ 优化跨境监管技术与流程
  
- **2010: ETI developed Food Quality Management System**  
(ETI 研发食品品质管理智能感知系统)
  - ◆ 针对冷链要求
  - ◆ 以RFID, 传感器及无 网络等技术, 开发食品品质管理系统
  - ◆ 整合离散而相关信息, 实现食品全程监控





# 基于RFID技术的食品安全供应链信息平台



- 由香港政府创新科技署创新科技基金资助研发
- 目的:
  - ◆ 建立一体化的基于RFID技术的食品安全信息服务平台
  - ◆ 提供不同IT应用服务予不同业界包括农场,食品加工厂,包装厂,分销商,运输业和监管部门
  - ◆ 通过提供高质量的信息服务释除公众对食品安全的顾虑
- 能支持政府不同部门,社会企业和公众:
  - ◆ 对食品有关信息的实时/在线的监管,监察和管理
  - ◆ 提供全程追踪溯源,满足不同需求
  - ◆ 食品安全事故双向交流和预警
- 合作伙伴:

香港	中国内地
<ul style="list-style-type: none"><li>▪ 香港物流供应链技术研发中心</li><li>▪ 大昌行物流(香港上市公司)</li><li>▪ 广南行(香港上市公司,生猪进口商)</li><li>▪ CitySuper超级市场(中港台)</li><li>▪ 惠康超级市场(香港上市公司)</li><li>▪ 国际通用公证行(SGS)</li><li>▪ IBM</li><li>▪ Motorola</li><li>▪ ...</li></ul>	<ul style="list-style-type: none"><li>▪ 中国政府口岸监管机构(CIQ)</li><li>▪ 中国科学院深圳研究院(SIAT)</li><li>▪ 深圳农产品集团(中国上市公司)</li><li>▪ 广东省RFID公共技术中心(GDRC)</li><li>▪ 中国海运集装箱集团(中国上市公司)</li><li>▪ 深圳鼎识...</li></ul>



# 基于RFID技术的食品安全供应链信息平台



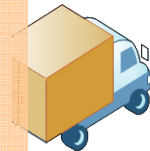
## RFID-enabled Platform Technology for the Integrated Shenzhen-Hong Kong Food Safety and Supply Chain Management Public Information Platform



### Research Focuses at Shenzhen

#### 深圳研发重点

- Develop an information platform to host food safety related data and provide effective services to support food inspection and supervision;
- With RFID and various technological means to facilitate the collection of food safety related and logistic information from farms, distribution centers, resellers and check points.
- Develop applications to support the implementation of green channel at the border control points.
- Study how such information can be made available to public



Cross Border

### Research focus at HK

#### 香港研发重点:

- Develop application service platform – FOSSIM, connected with FOSSIP to enable food info accessed from SZ and revert food supply feedback info from industries and consumers in HK

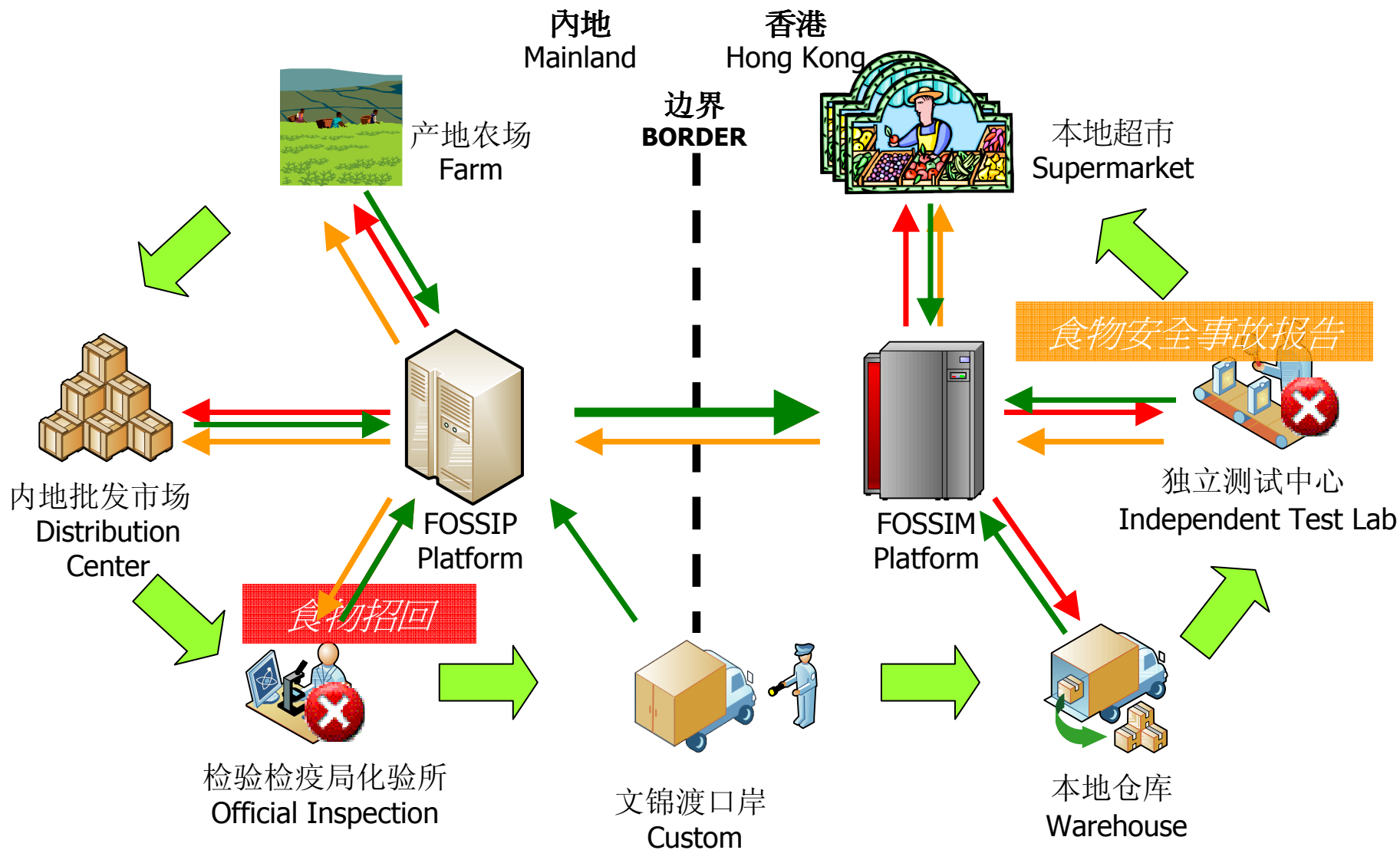
#### 开发应用服务平台

- With info from SZ, develop track and trace applications and services to support food industries and consumers in HK
  - Track and trace 追踪溯源
  - Incident report 事故报告
  - Food safety alert 安全预警
  - Product recall 产品回收
  - Food info kiosks in supermarkets 食品信息查询终端





# 食品安全供应链公共信息平台





## 核心技术和试点应用

### ■ 核心技术:

- ◆ 食品物流追踪溯源
- ◆ 食品物流和信息流的统一化
- ◆ 仓库, 分包装/食品再加工中心, 检测实验室和超级市场的应用
- ◆ 食品事故报告, 发布和预警, 食品回收
- ◆ 消费者为中心的食品信息传送

### ■ 试点应用:

- ◆ 食品仓库
- ◆ 分包装/食品加工中心
- ◆ 检测实验室
- ◆ 超级市场

- ✓ **通过试点应用, 显示解决方案和服务能在对企业最小影响下无缝集成到企业现有系统, 并提高现有的食品供应链的整体表现**
- ✓ **通过试点, 建立与食品安全相关数据需求和格式, 共同定义, 信息交换和控制的机制, 提供政府机构对公布相应数据的效应作相关的评估**



# 食品安全供应链公共信息及服务平台





# 追踪蔬菜和水果的食品供应链



## 追踪溯源



The screenshot shows the eti web application interface. On the left, a flow diagram illustrates the supply chain path with nodes: 光明农场 (Guangming Farm), 深圳南山农产品批发市场 (Shenzhen Nanshan Agricultural Products Wholesale Market), CIQ化驗行 (CIQ Laboratory), 深圳罗湖口岸 (Shenzhen Luohu Port), and 元朗合收貨棧 (Yuen Long Ho Yee Warehouse). Red circles highlight the farm, market, and laboratory nodes. On the right, a detailed 'Item detail' page for '大头菜' (Large Cabbage) is shown, including fields for source code, farm name, harvest time, weight, and various inspection and shipping records.

## 分销配送



The screenshot shows the 'Mobile Food Safety' application interface. It displays a 'Trace ID: Reprint' and a list of transactions for '唐生菜' (Tang Lettuce). The interface includes fields for Name, Type, Weight, Provider, and Node, along with a list of transaction IDs and timestamps.

The screenshot shows a detailed view of a transaction in the 'Mobile Food Safety' application. It displays the 'Trace ID: Reprint' and a list of transactions for '唐生菜' (Tang Lettuce). The interface includes fields for Name, Weight, Date, and a grid of transaction counts (1, 2, 4, 8, 10, 15).

## RFID与条码转换技术

利用电子秤或手持设备，把RFID转换并打印成可追溯的条码卷标以便在零售层面追踪







# 食品安全信息的管理

**Food Incident Information Center**

Search

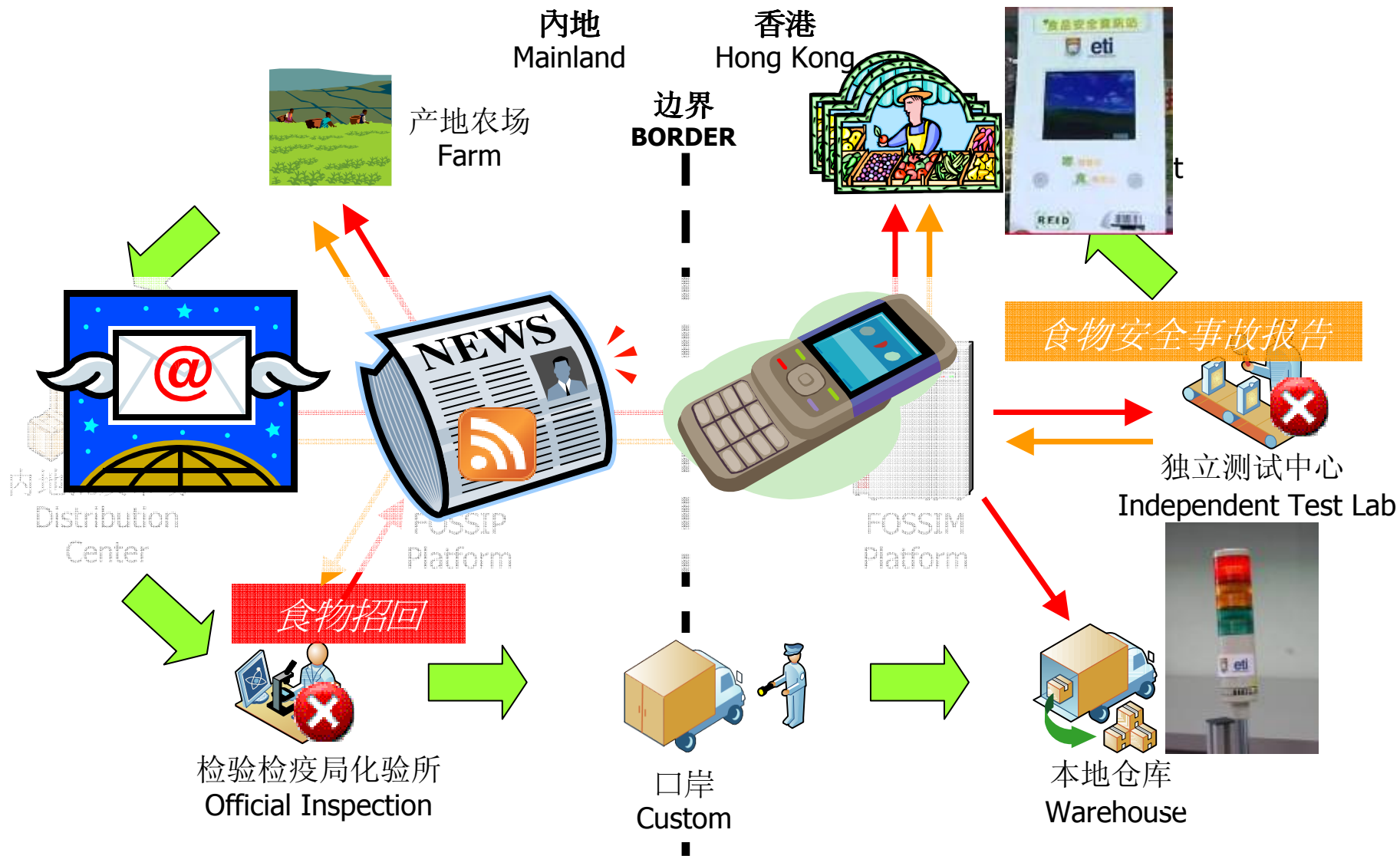
Create Incident

Incident List (2009-07-07)

View	Report Date	Reporter	Tag ID	Reason	Important	Edit	Delete
<a href="#">27</a>	2009-07-07	DCH Sampling Officer	305800000000000000000000000024	魚類貯存量超出安全標準10%	Low		



# 食品安全信息的发布







# 试点实施



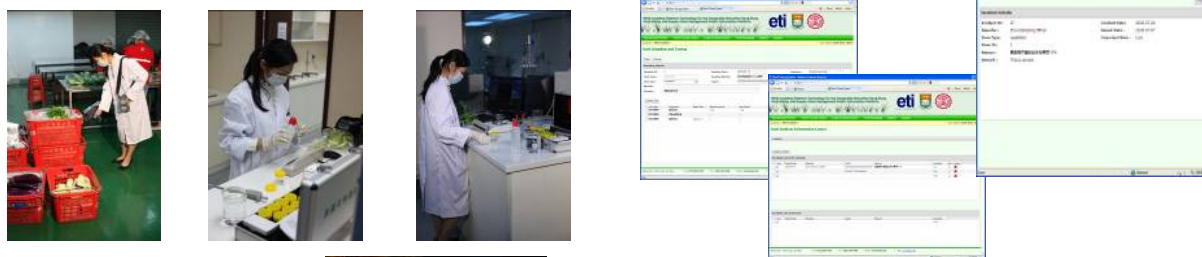
## ■ 食品仓库



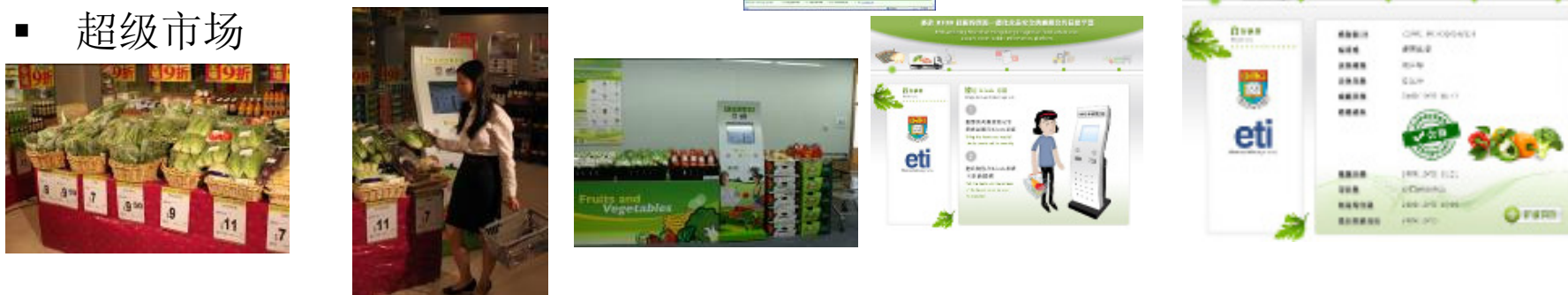
## ■ 分包装/食品加工中心



## ■ 检测实验室

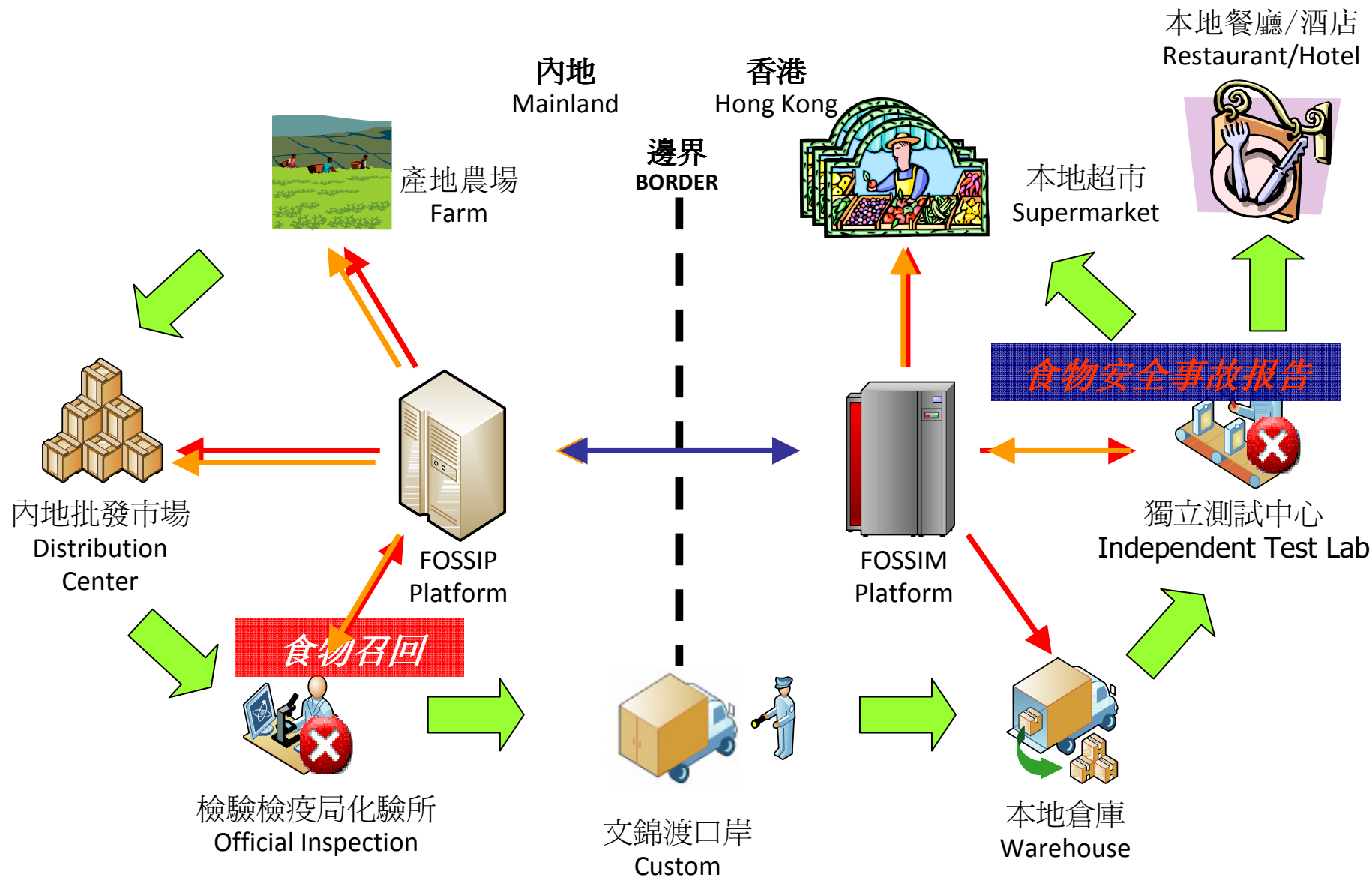


## ■ 超级市场



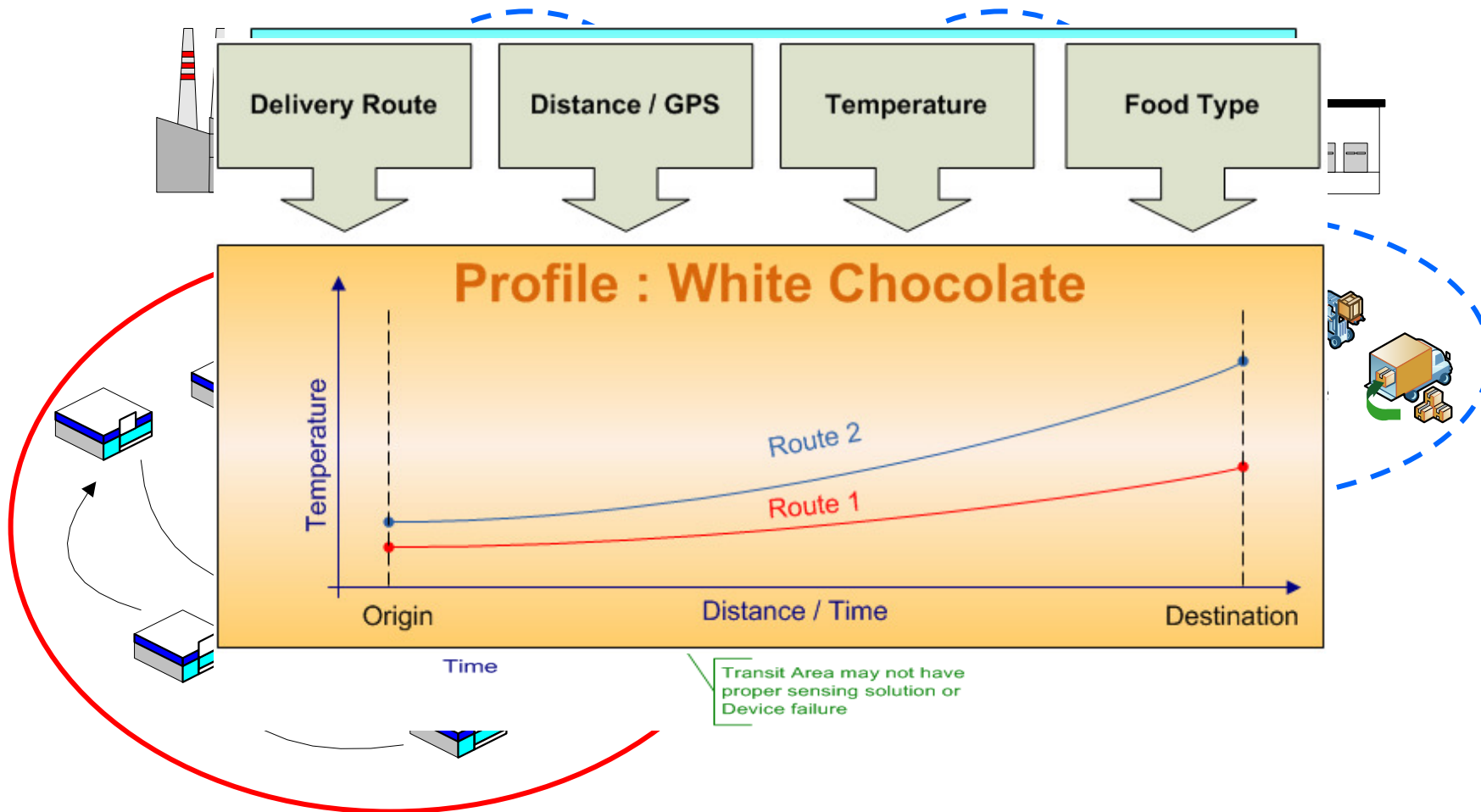


# 基于RFID的食品供应链公共信息平台 和实时食品品质管理系统的融合





# 目前狀況





# 实时食品品质管理系统



## ■ Primary Goal-主要目标

- ◆ Establish infrastructure and software applications to support end-to-end real time collection, monitoring and distribution of food quality / safety related information; and alerts and decision support capability on the (perishable) food supply chain  
建立能支持有关食品质量和食品安全信息实时收集，监控和发布的软件应用和信息架构，为整个易腐食品供应链行业提供预警和决策支持

## ■ Objectives-目的

- ◆ Extend FOSSIM with decision-support, monitoring and auto-alert applications for food quality management  
延伸食品安全信息平台的决策支持，监管和预警应用至食品质量管理
- ◆ Establish real time sensing information infrastructure, Sensor Data Cloud, to facilitate the collection, integration and dissemination of real time sensing data  
建立实时感知信息架构-感知数据云技术，以提升实时数据采集，集成和分析
- ◆ Research the management of wireless sensing technologies to accommodate large amount of sensors communicating at a clustered environment  
研发无线感知技术的管理，适应在复杂环境中的大规模感应数据的应用



# 主要合作伙伴



## Project Partners and Sponsors-项目合作伙伴

- LSCM & CIMC (香港物流及供应链应用技术研发中心及中集集团)
- GDCIQ & GZ DAPENG (广东出入境检验检疫局及广州大鹏集团)
- SZCIQ & Amoy (深圳出入境检验检疫局及深圳淘大)
- DCH Logistics, SGS (大昌行物流, 香港通用公证行)
- IBM, Motorola, Avery Dennison, SZ Promatic
- ...

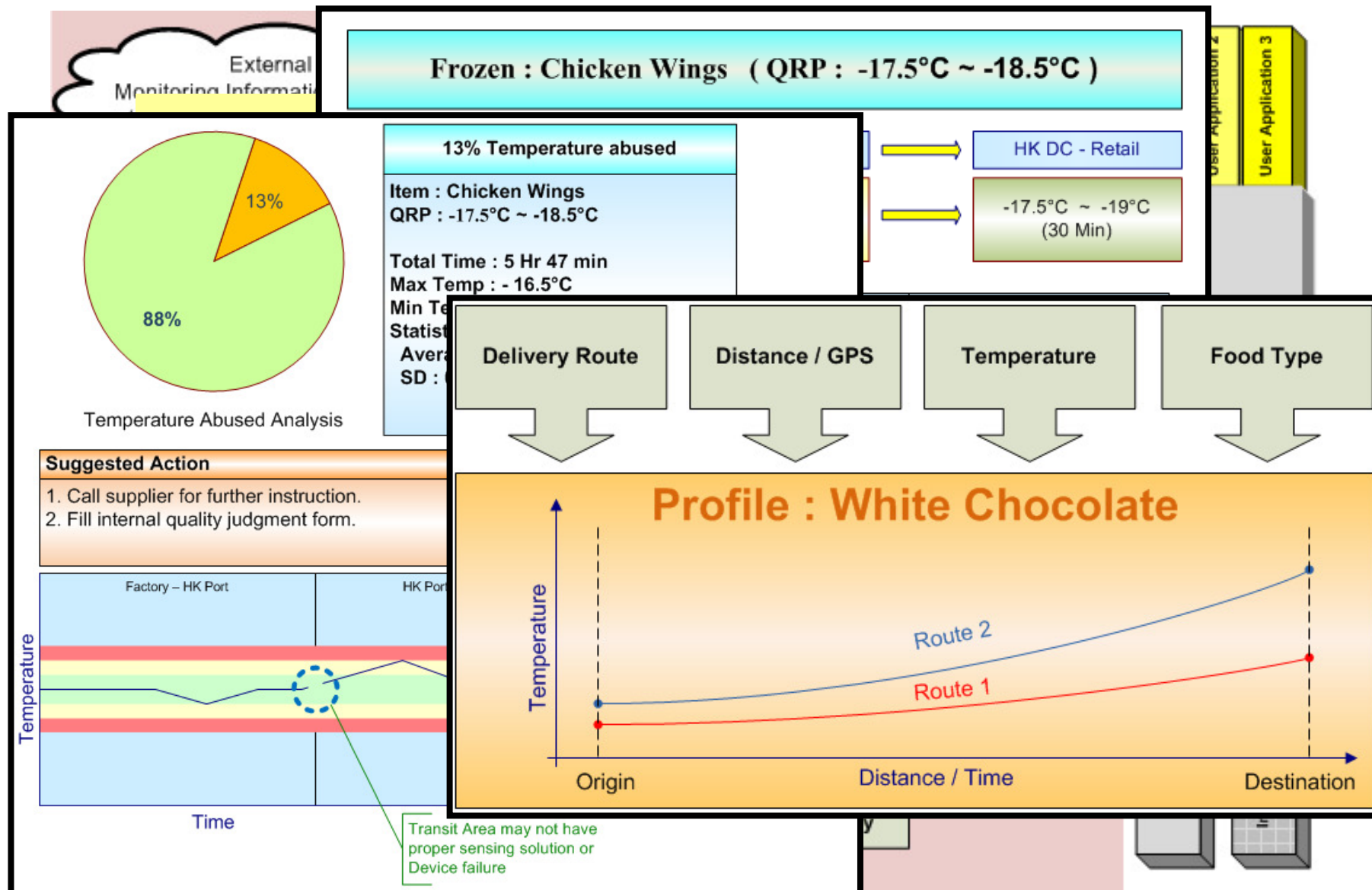
## Pilot users-试点用户

- ✓ DCH Logistics & Parkn'shop GD-大昌行物流
- ✓ GZ Dapeng Frozen Foods-广州大鹏
- ✓ CIMC-中集智能
- ✓ HK Wellcome-香港惠康
- ✓ ...





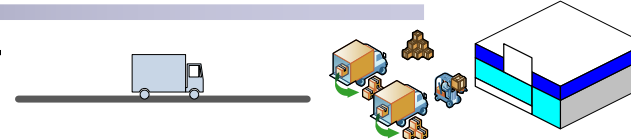
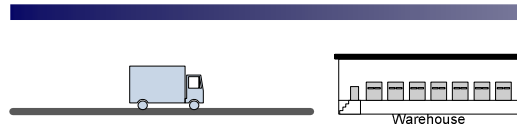
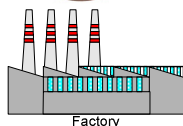
# 实时食品品质管理系统





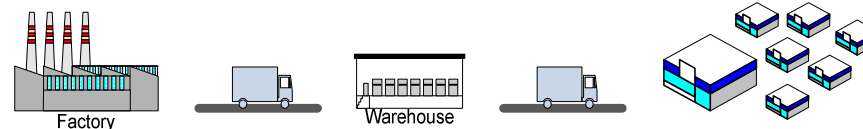
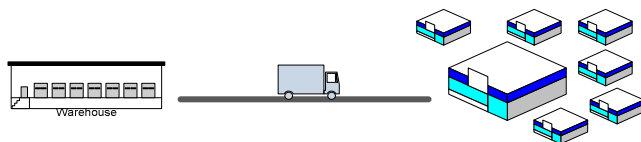


# 试点应用



Case	#1 直接运送
Objective	<ul style="list-style-type: none"> <li>Test out the practicability of wireless sensing network, information infrastructure, application services</li> </ul>
Characteristics	<ul style="list-style-type: none"> <li>Point to point, Regular route</li> <li>Relatively short time, Single item type</li> </ul>
Product Examples	<ul style="list-style-type: none"> <li>Chilled chicken-冰鲜鸡</li> <li>Frozen dumpling-冷冻点心</li> </ul>
Technology / Applications being tested	<ul style="list-style-type: none"> <li>Good receiving advisor</li> <li>Delivery monitor with alert for manufacturer, 3PL</li> </ul>

Case	#2 直接运送和转运配送
Objective	<ul style="list-style-type: none"> <li>Integrate fragmented monitoring data to produce end-to-end visibility; Handle sensors interoperability</li> </ul>
Characteristics	<ul style="list-style-type: none"> <li>Point to point but with in-transit location</li> <li>Fragmented monitoring, Pallet / group level monitoring</li> </ul>
Product Examples	<ul style="list-style-type: none"> <li>Mixed frozen food in a monitoring unit, e.g. mobile freezer</li> <li>Overseas vegetables-海外蔬果</li> </ul>
Technology / Applications to be tested	<ul style="list-style-type: none"> <li>Delivery monitoring with alert for buyer</li> <li>End to end visibility through integrating sensing data from multiple channels</li> </ul>

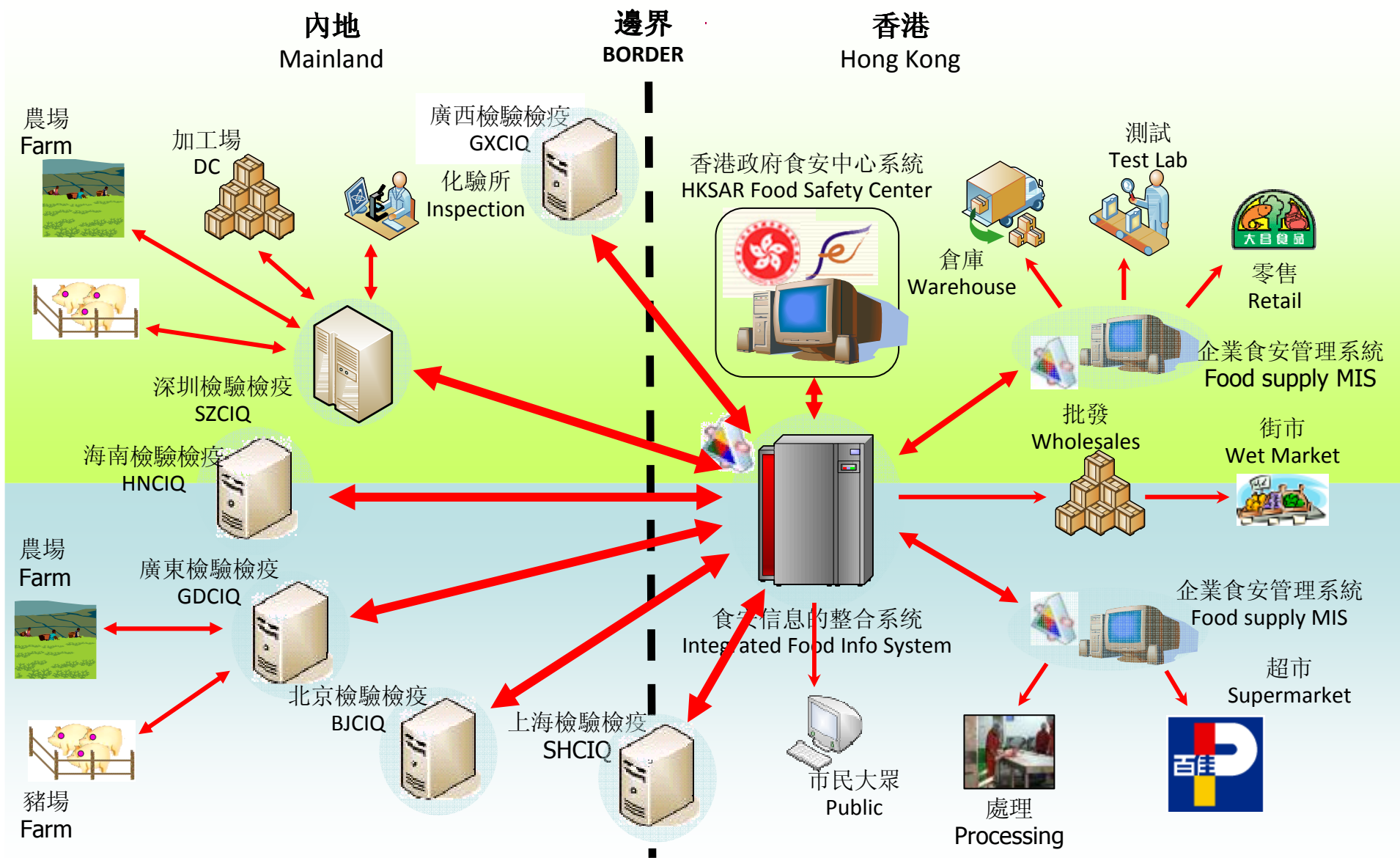


Case	#3 多站式配送
Objective	<ul style="list-style-type: none"> <li>Quality preserving over distribution at multiple stores</li> </ul>
Characteristics	<ul style="list-style-type: none"> <li>One to many stops, Clutter environment</li> <li>Multiple product types</li> </ul>
Product Examples	<ul style="list-style-type: none"> <li>Cake, moon-cake-冰皮月饼</li> <li>Lunch boxes-饭盒</li> </ul>
Technology / Applications to be tested	<ul style="list-style-type: none"> <li>Distribution monitor &amp; performance evaluation</li> <li>Routing efficiency</li> <li>Sensing performance under clutter environment</li> <li>Integration with 3G LBS information</li> </ul>

Case	#4 长途运送的供应链管理
Objective	<ul style="list-style-type: none"> <li>Dispatching of a production batch</li> </ul>
Characteristics	<ul style="list-style-type: none"> <li>Single delivery followed by multiple dispatching</li> <li>Long trip, may involve multiple carriers or cross-border</li> <li>Intermediate warehouse exists</li> </ul>
Product Examples	<ul style="list-style-type: none"> <li>Moon-cake-月饼</li> <li>Chocolate-巧克力</li> </ul>
Technology / Applications to be tested	<ul style="list-style-type: none"> <li>FEFO dispatching advisor, Route monitor and advisor</li> <li>Warehouse monitoring</li> <li>Supply chain visibility and optimization</li> <li>Integration with external sensing information network</li> </ul>



# 发展路线图：食品安全信息交换港





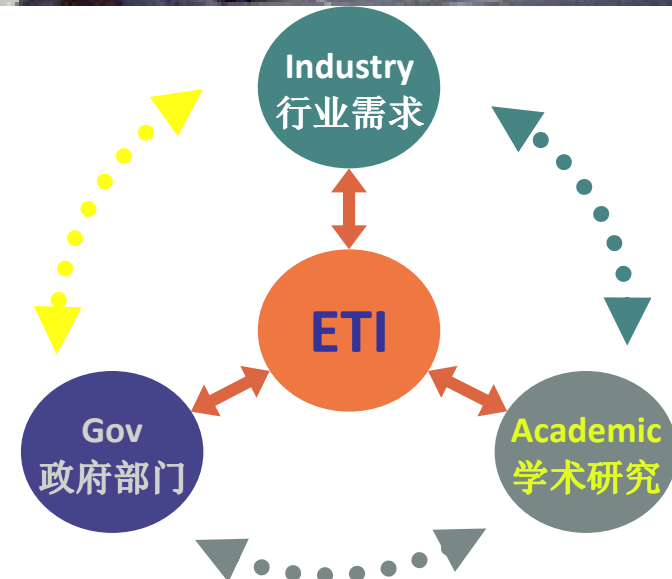
# 香港大学电子商业科技研究所简介



## E-Business Technology Institute The University of Hong Kong (1999)

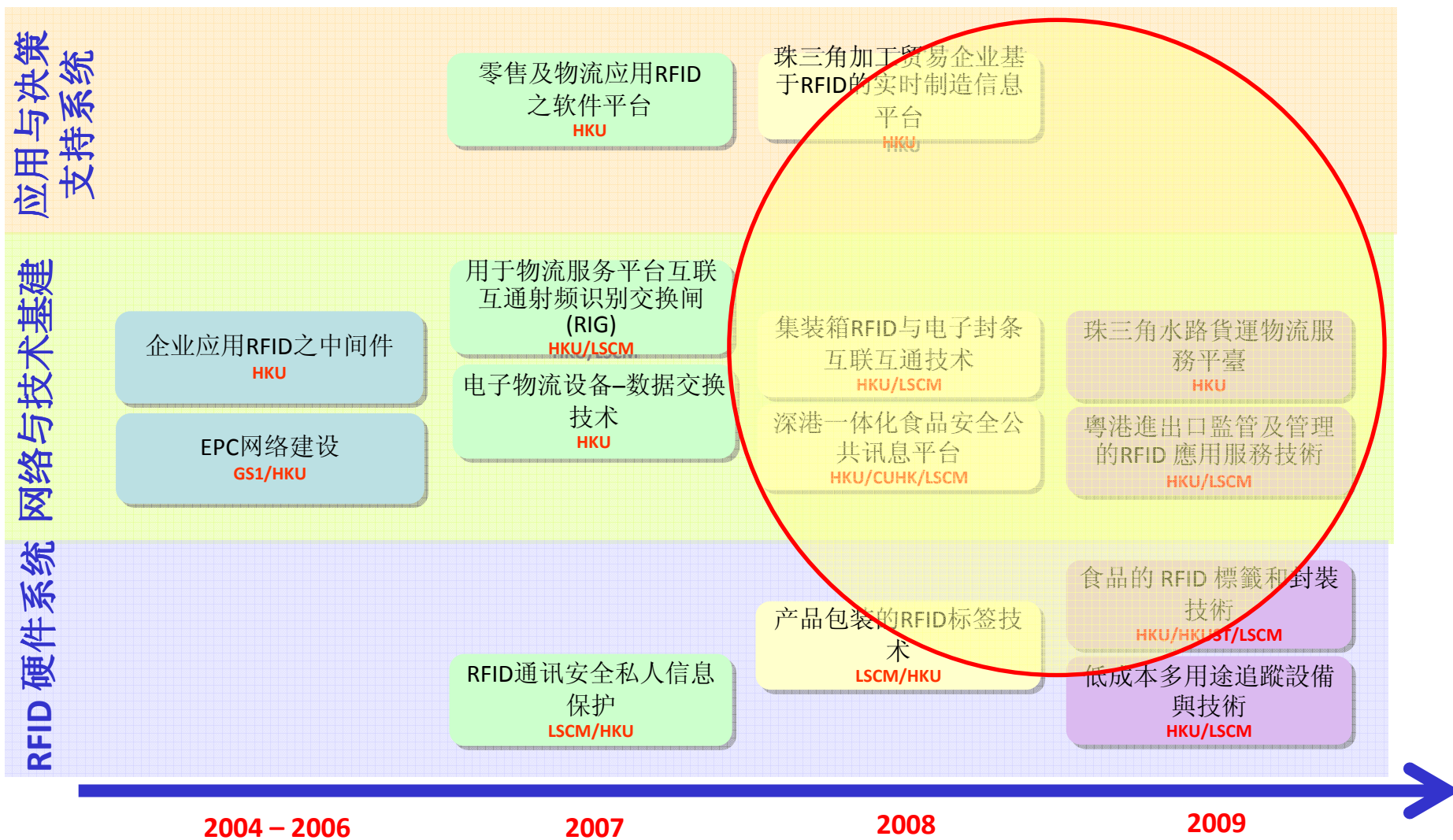
*Create Value through  
Innovation & Applied Research by:*  
(致力于创新技术的应用研发,  
推动和促进技术交流合作)

- Conducting basic applied research in e-business technology & policy
- 电子商务技术与策略研究
- Developing e-business application solutions
- 开发电子商务解决方案
- Promoting and Fostering technology exchange and co-operation
- 促进技术交换与合作
- Training e-business professionals
- 培育专业人才





# 研究项目路线图





# 研发成果



RFID食品安全应用

ECG关贸链

RFID零售业应用

RtMFG实时制造信息平台

商业智能/数据挖掘

面向服务的架构 (SOA)

RFID互通关闸

RFID包装印刷业应用

ETI重点研究领域

RFID中间件

Services & Solutions  
服务和解决方案

- Logistics Solutions
- Government Services
- Retail Solutions
- Library Services

无线技术/移动商务锦囊

平台架构

E-Service Architectures  
电子商务架构



数据安全/电子支付

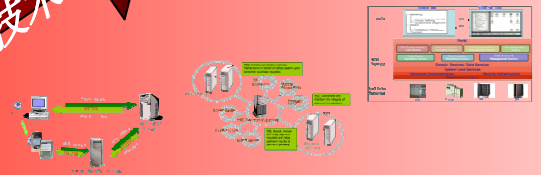


- ASP Business Platform
- WDC Application Development Platform
- EPD Integrated Service Platform

E-Commerce Technologies  
电子商务技术



- E-donation
- Conference registration
- Property information portal
- Mobile Banking
- Mobile ESD
- Document classification





# 研发成就和商业化应用



- Grid 网络
- Web services 网络服务
- IPv6
- Next Gen Network 创新网络



产品应用和商业化 咨询和合作

创新科技

- RFID 无线射频技术及中间件
- EPC Infrastructure EPC架构
- Business Intelligent 商业智能
- Wireless Drill monitor 斜坡监测



研发项目



产品原型开发和试点



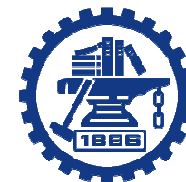
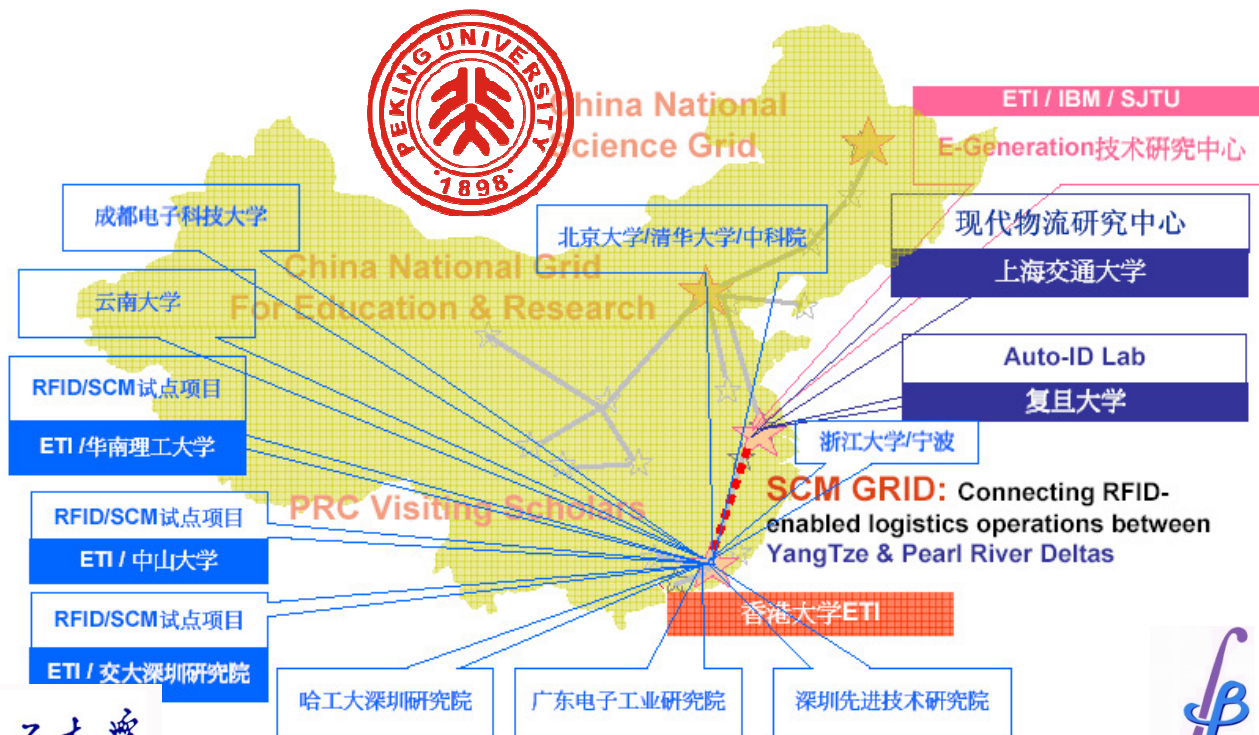
- MPS (e-payment) 电子支付
- Safe Connect (wireless PKI) 安全连接
- e-mail classification 电邮分类
- Messaging middleware 短信中间件
- RFID pilot and total solutions RFID全面解决方案







# 全球性合作伙伴



Hong Kong



广东省RFID公共技术支持中心  
Guangdong RFID Technology Service Center





## Your Strategic Partner for Innovative E-business Solutions

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- **URL:** [www.eti.hku.hk](http://www.eti.hku.hk)
- **Email:** [info@eti.hku.hk](mailto:info@eti.hku.hk)