2008-2009 R&D PROJECTS

Project Reference	GHP/024/07LZ
Project Title	**RFID-enabled Platform Technology for the Integrated Shenzhen-Hong Kong Food Safety and Supply Chain Management Public Information Platform**
R&D Organisation	Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies Limited Part A : The University of Hong Kong Part B : The Chinese University of Hong Kong

Abstract

[Part A]

The "RFID-enabling Shenzhen Hong Kong integrated food safety and supply chain public information platform" is a service platform based on RFID technology to provide publicly interested information related to food safety, food sources and food logistics. While leveraging the RFID as a food information carrier, our solution also integrates with different technologies, such as barcode, network and communication, to formulate an integrated system consist of an information platform and a number of applications. These applications cover various sectors on the food supply chain from Shenzhen to Hong Kong, like farm, re-processing, re-packaging, distribution, transportation and inspection, in the area of data collection, recording and exchange. This information platform aims at facilitating a highly effective and efficient informatics supply chain management, as well as enabling a seamless integration on the information requirement among various sectors in the food supply to Hong Kong, in order to synchronize the physical and information logistics. Apart from supporting the monitoring and management activities conducted by the government departments, our solution also benefits both the Shenzhen and Hong Kong enterprises in their business operation and management. More importantly, the public now realizes the high quality of service from the information age and feels comfortably relief on the food supply.

[Part B]

This project is to further advance develop the sensor-enabled RFID technology for the applications in food safety field, aiming the objective of hardware technology reinforcement for the universal supply chain visibility and monitoring. The project would facilitate the food quarantine and inspection in Hong Kong as well as the custom clearance. The core research work is dedicated to the sensor-integrated active RFID technology. The Chinese University of Hong Kong and its collaborators have been long working on issues in food safety and quality as well as traceability for a period of time. Based on the cumulated experiences and mature research techniques in the areas of active RFID, sensors, and integration of them, we will well develop the demanded hardware technologies for the better practices of food safety and quality management.

Project Coordinator Dr Frank Tong

2008-2009 R&D PROJECTS

Project Reference	GHP/025/07LZ
Project Title	**Interoperability Technology and Applications for Container RFID and e-seal**
R&D Organisation	Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies Limited

Abstract

Nowadays, 90% of the cargo shipments are conducted by means of containerized oceanic freights. China, in the recent years, has emerged in this world trend as the leader in such related industries, namely the container manufacturing, cargo shipping and trading. It is envisioned that the next generation container technology will be focused on smart container. Container RFID, e-seal, and the relevant standards will be the essential elements for the realization of containerized global supply chains and international green lanes across the world.

2006, the Shenzhen-Hongkong Green Lane initiative called for e-seal as the key technology to streamline the customs clearance and work flow for our cross-border trucking transportation. In a bigger roadmap, China is coining IP assets with innovations in e-seal, container RFID and the related IT infrastructures in the vision for the next generation smart container technology. Nevertheless, there is also a need for international standardization for these technology developments among different regulatory jurisdictions, vendor products and enterprise practices. Lack of interoperability will hinder the product development and industrial adoption. Today, technology proprietorship is still an issue for wide-scope implementation of the green lane at our Shenzhen-Hongkong border. Container tracking has not yet achieved interoperability among different tracking services and device vendors across the world.

This project, based on Shenzhen-Hongkong collaboration, is proposed to develop the key technologies of container RFID and e-seal, in line with China's vision of smart container. It is also to address the current application issues and cross-technology interoperability to help advance the e-seal capability of the local logistics industries and their integration with the worldwide market.

Our Shenzhen partners will be responsible for the development of smart container with RFID, e-seal and the information platform system. The Hongkong team will take on the R&D for the related interoperable middleware and gateway technologies. This project can serve as reference work to the contemporary China container standards development as well as to the localized Shenzhen-Hongkong cross-border application standards. The result will give industry good understanding of the applicability of container RFID and e-seal in respect of different levels of cross-border, China and international logistics requirements.

Project Coordinator Dr Frank Tong

2008-2009 R&D PROJECTS

Project Reference	GHP/042/07LP
Project Title	**RFID-Enabled Real-Time Manufacturing Shop-floor Information Infrastructure for PRD Processing Trade Enterprises**
R&D Organisation	The University of Hong Kong

Abstract

The project proposes to apply RFID technologies to develop an easy-to-deploy and simple-to-use shop-floor information infrastructure for manufacturing companies to achieve real-time and seamless dual-way connectivity and interoperability between application systems at enterprise, shop-floor, work-cell and device levels. The use of this proposed technology will allow manufacturing enterprises to improve shop-floor productivity and quality, reduce the wastes of manufacturing resources, cut the costs in manufacturing logistics, reduce the risk and improve the efficiency in cross-border customs logistics and online supervision, and improve the responsiveness to market and engineering changes. The proposed infrastructure performs several key functionalities.

1. RFID devices, value-adding manufacturing objects (e.g. machines, materials, pallets, tools and operators) and their operational logics / intelligence are combined so that manufacturers are able to cost-effectively adopt real-time technologies for collecting and processing real-time manufacturing data.
2. A shop-floor can be reconfigured at the level of work-cells from RFID-enabled smart manufacturing objects and at the level of manufacturing processes from smart work-cells. Gateway systems are developed at two levels to connect the shop-floor application systems to enterprise application systems and to work-cell application systems respectively.
3. The proposed infrastructure provides a suite of tools for different personnel (e.g. shop-floor managers and operators, process planners, facility managers, enterprise customs officers) to manage and visualize real-time shop-floor information, and to monitor business operations and facilitate adaptive decision making in different stages of manufacturing definition, configuration and execution.
4. Three pilots will be conducted to demonstrate how the proposed infrastructure can be used to develop new and upgrade existing enterprise application systems to make use of real-time shop-floor data. Case studies will focus on
   (1) adaptive scheduling system using real-time shop-floor information in a part fabrication company;
   (2) responsive shop-floor planning and scheduling system considering real-time disturbances (engineering changes, supply changes, customer requirement changes) for assembling large-sized products; and
   (3) preparation of periodical customs inspection data and estimation of actual unit consumption based on real-time shop-floor information in a large processing trade enterprise.

Project Coordinator Prof George Q. Huang

2008-2009 R&D PROJECTS

Project Reference	GHP/044/07LP
Project Title	**Trustworthy RFID Technologies: Methodology and Practice**
R&D Organisation	The Hong Kong University of Science and Technology

Abstract

RFID (Radio Frequency Identification) is an important enabling technology for logistics and supply chain management systems. The amount RFID devices will continue to leap in coming years. It was predicted that China will need at least 4.5 billion RFID devices in 2008, and 5.5 billion in 2010. At present, there are well over 100 RFID vendors and enterprises in China. Despite enormous propaganda on RFID and its great potential, large-scale deployment of the trust-enabled RFID technology is still uncommon. There is an immediate need to further advance the trustworthy technology of RFID before its benefits can truly be realized in Logistics and Supply Chain Management (LSCM). Challenging problems have been raised by the industry on security and privacy. Solutions to these problems will bring major impacts on the popular deployment of the RFID technology, which is a core area of logistics and supply chain management. We propose to develop a set of trustworthy RFID methodologies. Based on the research expertise of this project team, four critical technologies will be developed for trustworthy RFID computing to exploit the emerging opportunities. First, we design a privacy preserving authentication mechanism for enabling trust while protecting the user's private information. Second, in recognition of the increasing importance of RFID in LSCM, we will develop a set of efficient trustworthy RFID protocols both for capacity-limited RFID devices and large-scale systems. Third, we will propose secure authentication and self-protection schemes for enhancing the security of trustworthy RFID computing infrastructure. Last, we will develop a trustworthy platform to support security and privacy development for RFID systems. With them, we shall introduce an integrated solution for trustworthy RFID computing to the market and license the trustworthy RFID methodology to LSCM vendors and users.

Project Coordinator Dr Yunhao Liu

Project Reference	GHP/046/07LP
Project Title	**Package-specific RFID Tagging and Embedding Technology**
R&D Organisation	Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies Limited

Abstract

Driven by the mandates from world's biggest retailers (WalMartR, MetroR, etc), along with increasing requests from logistic companies and supply chain providers around the world, RFID tagging is becoming a critical procedure in the product packaging industry. In Hong Kong and the Pearl River Delta (PRD) region, with the world's largest manufacturing and production cluster, more and more products are packaged with RFID labels and shipped into the world supply chain.

However, current RFID tagging procedure still relies on slap-and-ship of RFID labels on product packages, which is time-consuming, prone to damage and not cost effective. More importantly, because the performance of RFID antennas is greatly dependent on the packaging and content materials as well as the form-factors of the package itself, general-purpose RFID tags will not yield the best performance in most applications.

In this project, we propose to design product specific RFID tags that are tuned and optimized for the packaging materials and different form factors, and explore the enabling technologies that will embed RFID tags inside product packages. The project will focus on case level packaging on paper and plastic packaging materials. This project will greatly facilitate the deployment of RFID technology in the packaging industry as well as other RFID applications in Hong Kong and PRD region.

Project Coordinator Dr Terry Ye

2008-2009 R&D PROJECTS

Project Reference	ITP/022/08LP
Project Title	**RFID Benchmarking Methodology, Report and Tool Support**
R&D Organisation	The Hong Kong University of Science and Technology

Abstract

As an important and practical means, RFID (Radio Frequency Identification) devices can effectively support information collection, location-sensing, and object-monitoring in Logistic and Supply Chain Management systems (LSCM). In particular, RFID tags attached to items or persons can facilitate identification and localization. Innovative RFID applications are also emerging to leverage RF signals to achieve a so-called device-free detecting and monitoring scheme. The RFID technology, however, has not yet supported LSCM systems with accurate detection and measurement. First, many environmental and operating factors can affect the measurements and performance of RFID devices in real application settings, where precise quantification of these factors and their relations are difficult. Second, the heterogeneity of RFID components imposes challenges to uniformly quantify their performances. The lack of scientific classification and evaluation of the performance constrains the large-scale deployment of off-the-shelf RFID products in LSCM systems. Addressing the problems, we will develop an extended RFID benchmarking methodology leveraging established results of project (ITP/022/07LP), the prior phase of this project. With our technological excellence in RFID, we will establish a RFID Benchmarking and Test Consortium. We have invited the Institute of Automation (中国科学院自动化研究所, CASIA), which was recently awarded a major 863 project on RFID benchmarking and testing, The RFID China Alliance (中国RFID产业联盟), GuangDong RFID Technology Support Center (广东省RFID公共技术支援中心), Bureau of Quality and Technology Supervision of DongGuan (东莞市品质技术监督局), Beijing University of Post and Telecommunications (北京邮电大学), China Electronics Standardization Institute (中国电子标准化研究所), Shandong Institute of Standardization (山东标准化研究院), China National RFID Products Quality Supervising Test Center (国家电子标签产品品质监督检验中心), and GS1 China (中国物品编码中心) to join our consortium. This project has attracted strong support from major Hong Kong enterprises. With these key RFID organizations in mainland China and Hong Kong, we will continue our RFID Benchmarking and Test Methodology development, perform the pilot deployment, release the official benchmarking report, and market and license the developed software tool support to mainland RFID vendors and users.

Project Coordinator Prof Shing-chi Cheung

Project Reference	ITP/023/08LP
Project Title	**RF-based Technologies for Asset/Personnel Tracking**
R&D Organisation	The Hong Kong University of Science and Technology

Abstract

Efficient RF-based asset/personnel tracking with smart tags will be important in terms of improving safety and productivity in the coal mining industry. Tracking equipment assets underground allows better management and utilization of these items. Meanwhile, tracking the location of personnel underground by using personal tags improves mine safety, particularly in emergency situations. Because the underground coal mine environment presents many key challenges for RF-based localization and tracking schemes, comprehensive real measurements will be collects in this project to understand the transmission capability of devices with different radio frequencies. By exploiting the research expertise of this project team, four different types of RF-based localization schemes will be developed for efficient underground asset/personnel tracking. To make sure the performance of the proposed schemes can be evaluated in real working environments, low-power and intrinsically safe devices will be designed in this project to test the localization schemes. As underground mining is a major resource industry in Mainland China, there is great market potential for the results of this project.

Project Coordinator Prof Qian Zhang

2008-2009 R&D PROJECTS

Project Reference	ITP/024/08LP
Project Title	**Enhancing the Competitiveness of the Hong Kong Air Freight Forwarding Industry Using RFID and Software Agent Technologies**
R&D Organisation	The Hong Kong Polytechnic University

Abstract

For many years now, Hong Kong has been a leader in international air cargo processing. To maintain its long-term competitiveness, there is a strong need for Hong Kong to invest in applied research on advanced air freight forwarding services. With the collaboration of HAFFA, the most representative air freight forwarding association in Hong Kong with over 300 company members, we propose to investigate the use of RFID and software agent technologies to enhance the competitiveness of Hong Kong's air freight forwarding industry. In particular, we will develop a basic RFID-based air cargo processing system and employ software agents to facilitate the important task of flight planning. Extensive tests or pilot runs using real air cargo items will be conducted with our industrial partners. The test results will provide valuable reference (e.g., case studies) for Hong Kong's air freight forwarding industry. Project deliverables/results will be disseminated through industrial seminars for the benefit of Hong Kong.

Project Coordinator Dr Henry Chan

Project Reference	ITP/034/08LP
Project Title	**Lightweight RFID Reader Chip for NFC and Mobile Applications**
R&D Organisation	Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies Limited

Abstract

As UHF RFID prevails in the deployment of supply chain automation, the technology is also starting a paradigm shift into the item-level applications, where near-field-communication (NFC) with individual items plays an important role in product verification, authentication and proof-of-transaction.

NFC RFID readers are expected to be widely used as mobile devices where mobility and security are of the greatest concerns. However, today's UHF RFID protocols do not have enough security mechanisms built in; The readers are too complicated to operate, consume too much power and are too expensive. In fact, most NFC applications only require a tiny fraction of all reader features, most other functions are not only over-kill, but drastically increase the reader cost and power consumption as well.

This project will propose a low-cost and lightweight RFID reader chip that is tailor-made for NFC applications with the following features: 1) Proprietary secured communication engine compatible with current UHF Gen2 protocols. 2) Reduced complexity of Gen2 functional set that retains only those needed for NFC applications. 3) Significantly reduced power consumption. 4) Minimized silicon cost and peripherals that result in significantly reduced system integration cost. Nevertheless, the proposed chip will still be compatible with other commercial UHF Gen2 tags.

Project Coordinator Dr Terry Ye

2008-2009 研发项目

项目编号	GHP/024/07LZ
项目名称	**深港一体化食品安全及供应链管理公共讯息平台及RFID关键技术**
研发单位	香港物流及供应链管理应用技术研发中心 甲部份: 香港大学 乙部份: 香港中文大学

项目简介

[甲部份]

「深港一体化食品安全供应链公共信息平台」是一个基于 RFID 技术的物流公共服务平台，使用 RFID 技术作为信息载体，兼顾条码、集成网路与通讯等技术为一体，该系统由信息平台与其支撑的示范性应用组成，示范性应用涉及供港食品供应链的种植/养殖、加工、配送、运输、口岸检验等诸多环节的信息采集、记录与交换；建设这一平台是为了实现信息化时代的高效物流管理，同时能使供港食品物流服务链各个环节实现无缝衔接，使供应链处于透明状态，达到物流与信息流统一。这样不仅可以帮助政府相关职能部门进行有效地监督和管理，同时也给深港两地企业在管理和经营上带来极大便利，更重要的是能够让公众享受到信息化时代的优质服务以及享用到安全放心的食品。

[乙部份]

课题将就食品安全领域的应用对 RFID 与传感器共性技术进行进一步的研发，为实现食品供应链全程透明溯源与监管提供高效、精确、可靠的硬体基础，来推动香港食品检疫检验科学有效地展开，加速通关。核心任务为完善拓展感测器集成的有源 RFID 技术。香港中文大学与合作伙伴长期致力于食品安全品质及其溯源应用的研发工作，取得多项独有技术，并建有被各界广泛访问的专业网站，推广了新颖的理念与技术。我们并多次接待粤港政府、社团及研发机构的交流访问。其中包括深圳先进院和香港 LSCM 中心，并提供资料与谘询。基于多年研发工作的积累和市场上的成熟技术，我们定能研究与发展一套高效的有源 RFID 与传感器集成技术，科学地协助解决食品安全品质问题。

项目统筹人　唐志鸿博士

Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies
香港物流及供应链管理应用技术研发中心

2008-2009 研发项目

项目编号	GHP/025/07LZ
项目名称	**集装箱电子标签与电子封条互联互通技术及试点应用**
研发单位	香港物流及供应链管理应用技术研发中心

项目简介

货物运输集装箱化是现代物流的发展趋势，全球90％货物由海运完成。近年来，无论是集装箱的生产量、吞吐量及贸易量，中国都已经在全球占绝对主导地位。下一代的集装箱—智慧集装箱，已经成为集装箱未来发展的必然方向。研发集装箱电子标签和电子封条，制订相关标准，是实现全球范围内全供应链的集装箱跟踪监管，实现安全贸易通道，国际海运绿色通道的一个基本要素。在深港运输发展方，电子封条是 2006 年启动的深港合作的绿色通道车载通关项目的关键技术。它简化了深港货车运输清关系统与流程。同时集装箱物流资讯化中的一个关键部分是 RFID 电子封条，电子封条取代现有的机械封条，实现封条资讯和状态的自动识别与管理。

当前集装箱物流过程的信息化水平是制约当今集装箱运输发展的瓶颈之一。由于集装箱自身不载有信息，在运输过程中，对集装箱的流向和识别只能靠人工操作，大大影响了运输、装卸和管理效率。对全球集装箱供应链来说，准确获取货物的位置与安全信息，实现供应链透明，优化管理，减少库存和运输周期的不确定性，提高供应链的效率和效益具有极其重要的意义，也是现代物流的迫切需要。

由于现在还没有正式的电子标签和 RFID 产品国际标准，因此各国、各个企业和科研机构推出的产品会互不兼容。以RFID频率为例，其频段就多达6种之多。分别有135kHz、13.56MHz、433.92MHz、860～930MHz、2.45GHz 和5.8GHz。每种频段各具特色，也都有缺陷，应用领域也不尽相同。再者虽然 RFID 电子封条技术已在绿色通道进行初步的应用，但因讯息互通问题，由两地 GPS 服务供货商所提供的实时讯息未能贯通。而两地所制造的电子封条，在技术上仍未能完全符合各方的需要。不容置疑，电子封条技术在通关物流方面有莫大的帮助，但亦要配合绿色通道的广泛实施并普及化。现在亦未能惠及其它省市和地区，所以货车拥挤的情况仍有待舒缓。

本项目透过深港科研合作，开发 RFID 共性技术，把电子标签应用到集装箱以实现集装箱自动识别，把电子封条与其它技术进一步集成且能互联互通，并共同实现试点和应用，展示行业最佳实践方法以供跨境货运物流业参考，帮助深港企业提升现代物流的效率。由深方负责开发 RFID 电子标签、RFID 电子封条、智慧集装箱安全设备及其读写设备、和集装箱供应链公共数据平台系统，而港方则负责集装箱电子标签与电子封条关键技术以及互联互通技术的研发，包括集装箱电子卷标系统互通操作中间件、集装箱物流服务平台互联互通交换闸及其伺服器系统及工具等，使不同电子封条物流应用服务平台能够互通运作。此外，本项目将会提出中国集装箱管理系统参考标准及本地跨境物流参考应用标准，让业界能参考电子封条技术的应用，配合国内、跨境及国际市场上货运通关项目的要求。

项目统筹人　唐志鸿博士

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2008-2009 研发项目

项目编号	GHP/042/07LP
项目名称	**珠三角加工贸易企业基于RFID的实时制造信息平台核心技术的研发**
研发单位	香港大学

项目简介

本项目计划使用射频辨识技术(RFID)为企业开发一套便于布署，易于操作的车间信息管理平台，从而实现企业层、车间层、加工单元层和设备层应用系统之间的实时、无缝、双向连接性和互操作性。这个平台将有效地帮助制造企业改善车间生产效率及产品质量，减少制造资源浪费，削减生产所引致之物流成本，提高跨境物流及海关联网在线监管的效率并降低其潜在风险，加速企业对于市场和工程变更的变更能力。平台包括以下主要功能：

1. 将 RFID 设备及增值加工对象（例如机床、原料、托盘、工具和操作员）与相关操作流程 / 智能互相集成，以帮助制造商使用低成本的方式获取和处理实时生产数据。
2. 车间可在基于 RFID 智能制造物件的加工单元层和基于智能加工单元的工艺过程层进行重配置。在两级开发的接驳系统使得车间层应用系统分别与企业层应用系统和加工单元层应用系统相连接。
3. 面向不同人员（例如车间管理员和操作员，工艺流程设计员，设备管理员，企业通关主任等）提供的工具套件，用于管理和查看实时车间信息，并在生产规划、配置和执行等阶段实现业务操作监视，以实现自适应决策。
4. 三个试验项目将用于展示如何使用本架构进行企业应用系统的开发和已有系统的升级来达到使用实时车间数据的目的。试验实例包括：
   (1)在一个零件制造企业中开发基于实时车间信息的自适应调度系统；
   (2)在一个大件产品装配企业中开发考虑实时扰动（工程变更、供应链变更或客户需求变更）的快速响应车间计划和调度系统；
   (3)为一个大型加工贸易企业根据实时车间生产信息准备中期海关核查数据和评估实际单耗。

项目统筹人　黄国全教授

2008-2009 研发项目

项目编号 GHP/044/07LP

项目名称 **可信无綫射频识别的关键技术之方法及应用**

研发单位 香港科技大学

项目简介

无线射频识别（RFID）是一项有助于提高后勤和供应链系统管理水准的重要技术。由于新的 RFID 元件将不断投入市场，中国对 RFID 元件的需求将由 2008 年至少 45 亿个增至 2010 年 55 亿个。目前，在中国有远远超过 100 家 RFID 厂商和企业。虽然无线射频识别的技术具备广阔的发展潜力，但可信的无线射频识别系统尚未大规模的部署。目前极需在无线射频识别系统中发展可信技术以推动其在物流和供应链管理系统中的发展和实际应用。工业界认为当前影响该技术发展的挑战性问题在于保护用户的安全和隐私。这些问题的解决将对无线射频识别的普及和发展产生巨大推动作用，同时这也将成为物流与供应链管理系统的关键技术。为满足这种需求，我们在本项目书中提出发展可信的无线射频识别技术。我们团队拥有优秀的科研人才，并且积累了分布式系统、无线网络等相关领域深厚的科研及系统开发的经验。深入研究并掌握其中的关键技术是抓住这次无线射频技术发展机遇的关键。基于我们最新的科研成果，我们建议开发四种可信的无线射频识别中的关键技术。首先，我们准备开发一种可以保护用户隐私的安全认证机制。该机制可以在保护用户隐私的前提下实现无线射频用户间的信任。其次，意识到无线射频技术在物流和供应链管理中扮演越来越重要的作用，我们将设计一整套高效的可信无线射频技术之协议和系统，在支持计算能力受限的无线射频设备的同时，也满足大规模无线射频系统的应用。另外，我们将提出安全认证和自我保护机制以满足可信无线射频计算架构本身的安全需求。还有，我们将设计集成无线射频可信计算平台以满足保护用户安全和隐私的需要。基于这四种关键技术我们将建立一个可信的无线射频识别综合解决方案并将其推广到广大的物流和供应链管理系统的用户。

项目统筹人 刘云浩博士

项目编号 GHP/046/07LP

项目名称 **适用于产品包装的RFID标签及嵌入技术**

研发单位 香港物流及供应链管理应用技术研发中心

项目简介

由于全球大型零售商（沃尔玛、麦德龙等等）的推动，以及物流公司、供应链参与者日益增长的要求，RFID 贴标已经成为产品包装行业的一道重要工序。香港和珠三角(PRD)地区拥有世界最大的生产制造产业群，越来越多的产品在包装上面贴上 RFID 标签之后，运送到世界各地。

然而，当前的 RFID 贴标过程还是直接在产品包装采用即贴即送的方式，该方式耗时、成本效益低而且标签容易被损坏。更重要的是， RFID 天线的性能大大地依赖于包装本身和产品的材料以及包装的形状特征，因此通用的 RFID 标签不会在大多数应用中发挥最好的性能。

在该专案中，我们建议设计特定包装的 RFID 标签，根据包装材料的特征与外观，进行调整和优化，并且研究如何将RFID嵌入产品包装的基本技术。本专案将专注于以纸及塑胶为包装原料的包装箱级别研究。该项目将大大地促进在香港和珠三角地区的包装行业中部署 RFID 技术，同时也必将促进其他 RFID 应用的发展。

项目统筹人 叶涛博士

2008-2009 研发项目

项目编号 ITP/022/08LP

项目名称 **无线射频识别基准测试的关键技术之方法及应用**

研发单位 香港科技大学

项目简介

作为一种重要而实用的工具，无线射频识别设备可以有效地在物流及供应链管理系统中支援资讯采集、位置感知、和物体检测等应用。特别是当无线射频识别标签贴附于商品或人体时可以促进识别及定位效率。某些基于无线射频识别设备的应用更是开创性地利用无线信号实现一种非绑定的探测及监控机制。然而，无线射频识别技术并没有在精确探测和测量方面对物流及供应链管理技术的形成强有力的支持。究其原因，第一，在真实应用环境及操作中有很多因素对无线射频识别设备的测量及性能产生了很大的影响，但精确的量化这些因素和他们之间的联系是非常困难。第二，无线射频识别设备的多样性也对这些产品的统一化度量提出了挑战。目前尚缺乏对无线射频设备的科学分类及评价，这极大地限制了成熟无线射频设备在物流及供应链管理系统中的大规模部署。为了解决这些问题，利用我们从先期项目实施（ITP/022/07LP）中获得的成果，我们将继续开发切实可行的无线射频识别基准测试技术。基于我们已在无线射频识别基准测试领域取得技术优势，我们将建立一个无线射频识别基准测试联盟。我们已经邀请了下列单位参与我们的联盟，中国科学院自动化研究所（近期正承担中国科技部863重大项目“无线射频识别基准测试”），中国 RFID 产业联盟，广东省 RFID 公共技术支援中心，东莞市品质技术监督局，北京邮电大学，中国电子标准化研究所，山东标准化研究院，国家电子标签产品品质监督检验中心以及中国物品编码中心。本项目同时得到了不同香港企业的大力支持。同这些位于中国和香港地区的无线射频识别的主要组织一道，我们将在继续研发无线射频识别基准测试科学方法学的基础上，实现原形系统的部署，发布正式的基准测试报告，同时向主要的无线射频识别设备生产商和用户推广所研发的软件及支援工具。

项目统筹人 张成志教授

项目编号 ITP/023/08LP

项目名称 **基于射频技术的资产/人员跟踪方法**

研发单位 香港科技大学

项目简介

运用智能标签、基于射频的有效资产/人员定位、跟踪在煤矿行业中对于改善安全管理和提升生产力起到十分重要的作用。对设备资产的跟踪将允许更好地管理以及充分利用这些资产。同时，通过个人标签来跟踪井下人员的位置使得在紧急情况下能提供有效的安全管理途径。认识到矿井环境给以基于射频的定位、跟踪方案提出了许多挑战，在本项目中，我们将进行详尽的实地测量以深入地了解不同的无线电频率在井下各种环境的传输能力。项目将开发4种不同的基于射频的定位方案来进行有效的井下资产/人员跟踪。为确保各提出方案的性能在真正的工作环境被评估，我们还将设计低功率且本安的硬件装置来测试不同的定位方案。煤矿行业是中国大陆的能源支柱产业之一，本项目的实施具有很好的市场潜能。

项目统筹人 张黔教授

2008-2009 研发项目

项目编号 ITP/024/08LP

项目名称 **运用射频识别和软件代理技术增强香港货物空运工业的竞争力**

研发单位 香港理工大学

项目简介

多年来，香港一直在国际货物空运方面处于领先地位。为了保持香港在此方面的长期竞争力，香港需要进行货物空运服务方面的研究。本计划旨在与香港货运物流业协会合作并开发利用射频识别和软件代理的相关技术以提高香港货物空运工业的竞争力。香港货运物流业协会拥有超过300个公司成员，是香港最有代表性的货物空运协会。此项目将研发和测试一个以射频识别技术为基础的空运货物的处理系统，而且会利用软件代理来支持计划航班的工作。开发的系统会以合作伙伴的真实货物进行测试。测试结果能给予香港空运货物行业提供参考（如个案研究）。项目的成果将会透过在香港召开研讨会方式发布与推广。

项目统筹人 陈峻斌博士

项目编号 ITP/034/08LP

项目名称 **于近场通讯 (NFC) 和移动应用的轻量级RFID阅读器芯片**

研发单位 香港物流及供应链管理应用技术研发中心

项目简介

UHF RFID 已广泛应用在供应链管理产业，同时 RFID 技术也开始在单品货物应用上得到重视。近场通讯（NFC）在产品证明、认证和交易证明中扮演着重要角色。

NFC RFID 读写器将会应用在手持设备中。可移动性和通讯安全将是关键因素。然而，现今 RFID 协议没有足够的安全机制，而且阅读器功能都过于复杂，耗电量大，而且都非常昂贵。实际上，大多数 NFC 应用只用到阅读器的很少一部分功能，多于功能不但不必要，而且大幅增加系统的成本。

本项目为 NFC 应用开发出一个低成本轻便的 RFID 阅读器晶片。主要功能包括1)与 UHF Gen2 协议相兼容的保密通信算法。2)优化 Gen2 协议的复杂功能。3) 晶片的耗电量将极大减少。4)优化晶片面积，系统成本将显着降低。阅读器将与目前广泛应用的 UHF Gen2 标签相兼容。

项目统筹人 叶涛博士