

The LSCM currently provides support to approximately 30 RFID projects involving more than 100 businesses and local universities.

By Dave Friedlos

Aug. 18, 2009—The Asia Pacific region is expected to experience high growth in RFID revenue due to rapid adoption of the technology in China, India, Thailand, Taiwan and other countries. In a report published in June 2009, entitled "Asia Pacific RFID Market," [Frost & Sullivan](#) cited market revenues of \$569.7 million in 2008 for the region, predicting that figure would reach \$2.17 billion in 2015, at a compound annual growth rate (CAGR) of 21.1 percent.

Anticipating significant potential benefits in leading RFID adoption, the Hong Kong government (HKSAR) established the [Hong Kong Logistics and Supply Chain Management Research and Development Center](#) (LSCM R&D) in April 2006. Funded by the HKSAR government's [Innovation and Technology Commission](#), the LSCM is run by the [University of Hong Kong](#), the [Chinese University of Hong Kong](#), and the [Hong Kong University of Science and Technology](#). Its role includes conducting industry research; providing technology and market intelligence; offering a platform for the exchange of intellectual property and technology; promoting technology development, transfer and knowledge dissemination; and assisting in the commercialization of technology.



Chung Jen Tan

The center currently provides financial support to approximately 30 RFID projects involving more than 100 businesses and local universities. Chung Jen Tan, the organization's chief executive, says the center's goal is to strengthen Hong Kong's economic competitiveness, as well as improve its technology leadership in the logistics and supply chain management industry.

"The LSCM provides a one-stop service for applied research, technology transfer and commercialization," Tan says. "Organizations ranging from large manufacturers, small and medium-sized enterprises, to overseas technology enterprises can participate in the center's industry and technology programs. As of July, more than 600 industry and technology players from Hong Kong, mainland China and overseas have joined as members. And each April and December, the center solicits project applications on specified R&D topics to break down technology barriers in hardware, software, systems and network design and development."

Projects funded by the LSCM range from the use of RFID for tracking air freight to monitoring personnel in underground mines, as well as electronic seals (e-seals) to secure ocean cargo containers. Earlier this year, the center provided HK\$12.86 million (US\$1.66 million) for the development of a lightweight near-field ultrahigh-frequency (UHF) RFID reader chip for mobile applications. Most passive UHF RFID tags and interrogators operate in the far field, enabling an interrogator to read and encode tags more than 10 meters (33 feet) away. Near-field interrogators and tags, on the other hand, have a read range

of only a few centimeters.

RFID readers are expected to be widely used as mobile devices, with mobility and security vital, but the LSCM believes current UHF RFID protocols lack sufficient built-in security mechanisms. The center is, therefore, funding research and development into low-cost, lightweight RFID reader chips tailor-made for near-field applications, with a proprietary secured communication engine compatible with current UHF EPC Gen 2 protocols, reduced complexity and power consumption, and minimized silicon cost for lower system integration expense.

Although most near-field RFID chips and protocols operate in the low-frequency (125 or 134 kHz) or high-frequency (13.56 MHz) ranges, the use of near-field tags and interrogators operating in the UHF band (860-960 MHz) is gaining momentum. Near-field UHF RFID has many advantages, such as lower tag cost, better read rates and anti-collision handling when interrogating large numbers of tags. The project aims to design a low-cost, low-power reader chip especially optimized for near-field applications.

Last year, the center provided HK\$12.85 million (US\$1.66 million) for a packaging-specific RFID tagging and embedding project. RFID tagging is becoming critical in product packaging, due to mandates from many of the world's largest retailers, including [Wal-Mart](#). Hong Kong and the Pearl River Delta region are home to one of the largest manufacturing and production centers, which package many products with RFID labels.

But current tagging procedures rely on the "slap-and-ship" method of putting RFID labels onto product packaging, which can be time-consuming, prone to damaging the tags and not cost-effective. The performance of RFID tag antennas is also dependent on the materials of the packaging and its contents. So the LSCM is funding the project to design product-specific RFID tags that are tuned and optimized for the packaging materials, then embed the tags into packages.

The center has developed a number of prototypes for UHF applications, including 3-D antennas that conform to the shape of packaging, self-destructive antennas embedded within package seals for tamper-proof applications, and antennas for metal-based packaging.

The LSCM has also allocated HK\$9 million (US\$1.16 million) to the Integrated Shenzhen-Hong Kong Food Safety and Supply Chain Management Public Information Platform project. The platform employs RFID technology to track food throughout the supply chain from Shenzhen in Mainland China to Hong Kong, and provides information related to food safety, such as pesticide test results, the food's source and logistics.

The project began in May 2008, and is slated to continue for another two years. Vegetables are currently being tracked using UHF EPC Gen 2 tags at the case level, in order to collect information from the farm through to processing and packaging centers, as well as distribution, transportation and inspection. A platform with applications for vegetable produce traceability and food safety alerts is now

ready for demonstration. The smooth tracking and tracing of vegetables through the supply chain has already been successfully demonstrated, Tan says, with more applications to be developed in the future related to alerts, recall and supply chain intelligence. The LSCM also expects to sponsor a project in which pigs are tracked via LF RFID tags attached to the animals' ears. The trial is due to begin in August 2009, then continue for two years.

The application platform will enable farmers, distributors, retailers and other stakeholders to access information to improve operations, while also facilitating the tracing and tracking of food and the issuing of recall alerts. According to Tan, the platform will provide benefits across the country, including to government agencies (by improving the inspections process), businesses (by improving operational efficiency) and consumers (by improving food safety).

"Distributors, hotels, supermarkets and restaurants will also be direct or indirect beneficiaries of this project," Tan states. "The platform can also be extended to other areas for total supply chain visibility."

The commercial benefits of the LSCM center are already being seen, Tan says, thanks to two projects that have already been completed: RFID Enablement Middleware for Enterprise Applications, or RAE (see [Hong Kong Begins RFID Middleware Project](#)), and Establishing an EPC Network Infrastructure to Enable End-to-End Supply Chain Visibility (see [EPCglobal Hong Kong Wraps Two-Year, Multi-Company RFID Project](#)). Both projects, he says, resulted in the development of commercial products.

"RAE was one of the six foundation R&D projects funded by the Innovation and Technology Commission but transferred to the LSCM at its inception," Tan explains. The project was granted HK\$10.5 million (US\$1.35 million) and completed in December 2006. "Upon completion, development on RAE was continued, and the RAE middleware was commercialized into RFiDY by [E-Business Solutions](#) to suit real business deployment. It allows companies to integrate new RFID systems with existing legacy systems at minimal effort and cost."

By adopting the middleware, Tan indicates, businesses will be able to connect quickly to global supply chain infrastructures, such as EPC, EDI and DTTN. RFiDY has already been adopted by organizations in the banking and finance, transport and education sectors. In two years, its generated value has exceeded its initial funding input by 140 percent. The EPC Network Infrastructure for End-to-End Supply Chain Visibility project has shown similar success, he notes.

"This project pioneered the building of an EPC infrastructure, and integrating it with real industry users of a global supply chain in four pilots, which required tremendous support from industry player of different sectors and leading institutes," Tan says. "Upon completion of R&D, a globalized track-and-trace platform, ezTrack, was launched in June 2008 to provide companies in Hong Kong and the Pearl River Delta region with real-time visibility of goods and product information."

The ezTrack platform, managed by [GS1 Hong Kong](#), enables companies to access information

regarding RFID-tagged goods moving through the supply chain, such as inventory data, progress status and delivery schedules (see [GS1 Hong Kong Launches Online Track-and-Trace Platform](#)). For an annual subscription fee, businesses receive access to the plug-and-play Web application, which requires no IT infrastructure investment to implement or upgrade. The platform is interoperable with existing enterprise resource planning (ERP) software and warehouse-management software (WMS) systems, provided they comply with the Electronic Product Code Information Services (EPCIS) standard.

With more than 30 projects still at the trial stage, Tan is confident commercial benefits will continue to flow, thus keeping China at the vanguard of RFID development.