For discussion
on 20 December 2011

Legislative Council
Panel on Commerce and Industry

Comprehensive Review of R&D Centres Set Up Under the Innovation and Technology Fund

PURPOSE

This paper seeks Members' views on the findings and recommendations of the Comprehensive Review of the R&D Centres set up under the Innovation and Technology Fund (ITF).

BACKGROUND

2. In April 2006, the Government set up R&D Centres in five selected focus areas to serve as focal points for conducting applied R&D and promoting commercialization of R&D results -

(a) Automotive Parts and Accessory Systems R&D Centre (APAS);

(b) R&D Centre for Information and Communications Technologies under the Hong Kong Applied Science and Technology Research Institute (ASTRI);

(c) Hong Kong Research Institute of Textiles and Apparel (HKRITA);

(d) Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies (LSCM); and

(e) Nano and Advanced Materials Institute (NAMI).

Except for ASTRI, each of them is set up as a separate legal entity with a hosting organization which possesses the necessary R&D infrastructure, hence enabling the Centres to commence operation as soon as possible. The hosting organizations and the latest staffing situation of the Centres are as follows -

	Hosting organization(s)	Staff Strength as at end-November 2011 *[Establishment]*
APAS	Hong Kong Productivity Council (HKPC)	29 [*33*]
ASTRI	N.A.	594 [*670*]
HKRITA	Hong Kong Polytechnic University (PolyU)	23 [*25*]
LSCM	University of Hong Kong (HKU), Chinese University of Hong Kong (CUHK) and Hong Kong University of Science and Technology (HKUST)	39 [*56*]
NAMI	HKUST	102 [*113*]

3. The total funding commitment approved by the Finance Committee (FC) for the R&D Centres (except ASTRI)[1] to meet their operating expenditure up to 31 March 2014 (i.e. for a period of 8 years) is $642.9 million. As at 31 March 2011, the cumulative operating expenditure of the R&D Centres was $274.5 million (or 43% of the approved commitments). R&D projects undertaken by the R&D Centres are funded separately by the ITF on a project basis.

4. In 2009, we conducted the Mid-Term Review of the R&D Centres. In seeking FC's approval for extending the Centres' operation, we undertook to –

(a) conduct a review in 2010 to look into the *modus operandi* of the R&D Centres to see if there is any room for achieving greater savings and higher cost-effectiveness; and

(b) conduct a comprehensive review in 2011 on the R&D Centres' operation and overall performance for the first five-year period, taking full account of their experience in technology transfer and commercialization.

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[1] *The operating cost of ASTRI is met from Government's annual recurrent subvention block grant.*

In respect of the level of industry contribution for the first five-year period, we also adjusted the original target of 40% to an interim target of 15% pending further review.

5. We reviewed the *modus operandi* for R&D Centres and submitted a report to this Panel in November 2010. In brief, the review concluded that the operating expenditure of R&D Centres supported a wide range of activities, including direct research, project vetting and monitoring, commercialization and administrative support. The findings and recommendations of the Comprehensive Review are set out in the following paragraphs.

LATEST SITUATION

6. We have reviewed the key areas of operation and performance of R&D Centres in their first five-year period (viz. April 2006 to March 2011). Having regard to the Centres' latest development, the level of industry contributions they secure should be one of the major performance indicators in reflecting interest and confidence from the industry in their R&D projects and results. Their operating and R&D expenditure, number of R&D projects undertaken and the level of industry contribution achieved during this period are summarized as follows –

Operating and R&D Expenditure of R&D Centres
from April 2006 to March 2011(*in $million*)

	(A) Operating Expenditure	(B) R&D Project Expenditure	(C) = (A) + (B) Total Expenditure
APAS	71.2 (*8.9%*)	89.9 (*5.9%*)	161.1
ASTRI	526.3 (*65.7%*)	1,114.0 (*72.8%*)	1,640.3
HKRITA	47.0 (*5.9%*)	98.0 (*6.4%*)	145.0
LSCM	71.0 (*8.9%*)	139.4 (*9.1%*)	210.4
NAMI	85.3 (*10.6%*)	89.5 (*5.8%*)	174.8
Total:	800.8 (*100%*)	1,530.8 (*100%*)	2,331.6

Number of R&D Projects[2] Commenced

	2006-07	2007-08	2008-09	2009-10	2010-11	5-year Cumulative
APAS	-	10 (1)[3]	10 (0)	17 (0)	10 (5)	47 (6)
ASTRI	21 (0)	37 (0)	46 (6)	48 (2)	44 (4)	196 (12)
HKRITA	-	16 (0)	12 (1)	13 (0)	10 (0)	51 (1)
LSCM	-	8 (0)	9 (0)	9 (2)	3 (0)	29 (2)
NAMI	-	7 (5)	7 (2)	17 (4)	14(6)	45 (17)
Total	21 (0)	78 (6)	84 (9)	104 (8)	81 (15)	368 (38)

Level of Industry Contribution Achieved
(based on approved project commitment)

	2010-11	5-year Cumulative (*April 2006 to March 2011*)
APAS	28.1%	16.5%
ASTRI[4]	20.3%	14.9%
HKRITA	12.3%	12.4%
LSCM	12.1%	12.3%
NAMI	41.1%	31.2%

[2] *Under ITF, there are broadly two types of R&D projects –*

(a) platform projects require industry contribution of at least 10% of the project cost from two or more companies. The industry sponsors will not be entitled to own the project IP; and

(b) collaborative projects require industry contribution of at least 30% (for R&D Centres' projects) or 50% (for non-R&D Centres' projects) of the project cost. The industry partner will be entitled to exclusive right to utilize the project IP for a defined period or own the project IP.

Seed Projects are capped at $2 million per project and aim to provide foundation work for future platform/collaborative projects. No industry contribution is required.

[3] *Figures in brackets denote number of collaborative projects.*

[4] *Due to historical reason, ASTRI has adopted a slightly different method of calculating industry contribution.*

ANALYSIS

(A) <u>APAS</u>

7. The performance of APAS showed marked improvements in 2010-11 when there was an increase in the number of collaborative projects and hence achieving a higher level of industry contribution of 28.1% that year. The overall industry contribution level was 16.5% for the first five-year period, hence meeting the interim target of 15%.

8. Among the completed projects, 6 are under commercialization. The Centre has established collaboration with BYD Company earlier this year on R&D of electric vehicles in Hong Kong. It has also installed its traffic information device prototype on 18 green minibuses for trial since July 2011. In the light of the improving performance, we propose to continue to invest in R&D of automotive parts and accessory systems industry.

9. We also see a case to improve the performance of APAS and achieve higher cost-effectiveness by merging APAS with HKPC for the following reasons -

(a) Both APAS and HKPC (its Automotive and Electronics Division (AED)) undertake applied R&D projects funded by ITF in automotive-related fields. Of the 47 projects funded under APAS in the first five-year period, 43% of these were undertaken by HKPC while 32% was by APAS staff and the rest by universities;

(b) HKPC's AED also conducts R&D projects in automotive technologies. To the industry, this may sometimes create confusion over the role of HKPC and APAS and their division of labour;

(c) Being an independent legal entity, APAS has devoted considerable amount of resources and efforts to deal with administrative and governance matters. Part of APAS's administrative and accounting work has already been outsourced to HKPC; and

(d) On staffing, APAS has experienced difficulties in recruiting and retaining R&D personnel over the years, possibly due to its small establishment and the more specialized research expertise involved.

10. Having considered all relevant factors, Government proposes that in promoting applied R&D in automotive parts and accessory systems in future, we should adopt a more cost-effective arrangement i.e. merging APAS with HKPC.

11. The proposal to merge APAS and with HKPC was discussed separately by both the APAS Board of Directors as well as HKPC Council. Both agreed to the proposed merger as they considered that the following benefits could be achieved:-

(a) A merger can facilitate closer collaboration between APAS and HKPC in R&D projects while making greater use of HKPC's resources and experience in promoting commercialization (e.g. publicity and industry networking). After the merger, HKPC can provide a one-stop shop service to the industry. HKPC's comprehensive staffing complement and extensive network in the Mainland can help to better market APAS's products and to tap the opportunities under the National 12th Five-Year Plan. Besides, the merger can provide a healthier career path for APAS staff as well as enhance the organization's capability in recruiting quality staff; and

(b) APAS can pool its resources to focus on R&D projects and technology matters, thus enhancing its R&D capacity.

(B) <u>NAMI</u>

12. The performance of NAMI is the best among all Centres with its level of industry contribution exceeding 40% in 2010-11 and a cumulative result of 31.2% for the first five-year period. During this period, 17 collaborative projects were undertaken by NAMI which was also the highest among all R&D Centres. This shows that NAMI has won the confidence of the industry. On Centre operation, NAMI has also grown

steadily and built up its in-house research capability, e.g. in renewable energies, to meet industry demand.

13. NAMI has been able to build up a cluster of research interest and efforts in photovoltaic (PV) technology and related areas, e.g. in addition to its mega project on thin-film PV technology, the Centre has recently commenced another large-scale project on CIGS solar cells. Progress has also been made in other market sectors including display and solid state lighting, environmental technologies, and building materials.

14. Among the completed projects, 7 are under commercialization with technology licences granted to several companies. Given its pool of collaborative projects already built up, NAMI's industry income should increase in the coming years.

15. NAMI has also been working actively in trial of its R&D results in the public sector. A solar cell demonstration system has been installed at the Tseung Kwan O Hospital as turn-key installation. Moreover, it has also been working with the Water Supplies Department for trial of nano-galvanized steel coating at sites susceptible to corrosion.

(C) <u>HKRITA</u>

16. The level of industry contribution achieved by HKRITA in 2010-11 was 12.3%, and the cumulative result for the first five-year period was 12.4%. This is below the interim target of 15%. Also, during this five-year period, only one collaborative project was undertaken by HKRITA which was the lowest among all R&D Centres. We note that the textiles and clothing is a mature industry and it is hence relatively difficult to break new grounds like nanotechnology or ICT. The situation however has improved starting from this year with two new collaborative projects commencing and hence resulting in an industry contribution of 28% for the seven-month period from April to October 2011.

17. On Centre's operation, HKRITA is unique in the sense that it does not have in-house research personnel. It draws on the expertise of the Institute of Textiles and Clothing of PolyU which is the only university

in Hong Kong with a dedicated textiles department. For the first five-year period, PolyU's Institute of Textiles and Clothing undertook 40 (or 78%) of the 51 R&D projects funded under HKRITA. HKRITA's role focuses on project solicitation and vetting as well as commercialization.

18. Among the completed projects, 12 are under commercialization with 12 technology licences granted to industry, including Nu-Torque™ Singles Ring Yarns, wet processing system, high performance sportswear, etc., at a total licensing income of $5.3 million. This makes RITA rank the second (after ASTRI) among the five R&D Centres in terms of licensing income. There is also industry interest in other R&D results like sportswear design software. On public sector trial projects, HKRITA is carrying out several projects involving use of new fabrics with special performance in uniforms for government departments and gearing up special fabrics for use and application by elderly homes, etc. There are also further companies, including one from overseas, expressing interest in licensing the Nu-Torque™ yarn technology. We also note that several projects in the pipeline, such as the manufacturing of formaldehyde hand-held sensor and imaging color measurement system, may have good potential for commercialization.

19. The Innovation and Technology Commission (ITC) has requested HKRITA to reinforce its performance, especially in facilitating commercialization, since it does not conduct direct research. These recommendations include:

(a) HKRITA to widen its pool of local collaborating partners apart from PolyU. For example, ITC has discussed with HKPC earlier on closer collaboration with HKRITA and other R&D Centres, by making use of HKPC's resources and experience in promoting commercialization (e.g. publicity and industry networking) and its 'more comprehensive' staffing complement and extensive network in the Mainland which can help to better market R&D Centres' results and to tap the opportunities under the National 12th Five-Year Plan;

(b) HKRITA to search for appropriate overseas and Mainland partners, both in terms of R&D collaboration and in evaluating market situation;

(c) HKRITA to step up its work in commercialization of projects; and

(d) HKRITA to strengthen networking with government departments/public bodies, companies/industry or trade associations, local universities and other research institutes for closer collaboration and to raise the profile of the Centre.

(D) LSCM

20. Despite a very vibrant logistics trade, the number of projects commenced by LSCM in the five-year period was the lowest among the five R&D Centres with only 29 projects, including two collaborative projects. Further, only three platform projects commenced in 2010-11. In terms of industry contribution, the cumulative result for the first five-year period was 12.3%. This is below the interim target of 15% and is the lowest among the Centres.

21. On commercialization, the progress has been slow. So far, LSCM has only managed to license two major R&D deliverables to the industry. LSCM is recently negotiating with interested parties for licensing a few projects and hopes to finalize the licensing agreements in the coming months.

22. To demonstrate the potential of its RFID applications, LSCM has been working with various government departments and public bodies in the past year to explore opportunities of collaboration. For instance, LSCM has been working on the development of an E-lock system for the Customs and Excise Department. LSCM has also started to work on the use of RFID in the Correctional Services Department's key handling and management system and Radio Television Hong Kong's AV equipment inventory.

23. On collaboration with the industry, we received feedback from the trade that LSCM had not been proactive enough in providing R&D support to the industry.

24. ITC as well as the LSCM Board of Directors have repeatedly asked the LSCM management to make improvements. For the first half of 2011-12, we witnessed slight improvements in the performance of LSCM. One platform project and two public sector trial projects have been approved in the period. Besides, one platform project has already been supported by the Centre's Technology Committee, and three public sector trial projects, two platform projects and one collaborative project are now being processed.

25. On staffing, LSCM has recently recruited a new CEO who has a strong industry and business background. Since the arrival of the new CEO, ITC has been working closely with him to improve the operation of LSCM, including boosting the level of industry contribution, delivering more projects with greater impact to the industry, facilitating a culture change in LSCM which would work on market-oriented projects more effectively. Major stakeholders, including industry players, will be consulted.

(E) <u>ASTRI</u>

26. ASTRI is different from the other four R&D Centres in that it has a longer history and hence has a much larger pool of R&D projects and successful cases of commercialization.

27. ASTRI's industry contribution has increased from 16.9% in 2009-10 to 20.3% in 2010-11 (with a cumulative result of 14.9% for 5 years, which is just marginally below the target of 15%). On commercialization, it has made some good progress in licensing its technologies to industry –

(a) During 2010-11, ASTRI attracted 3 new start-ups to establish their R&D and marketing centres in Hong Kong. These new companies are funded by US investors and are actively recruiting young R&D engineers in Hong Kong;

(b) ASTRI has licensed its compact anti-shaking technologies for camera phones to a company which offered a minimum licence fee-cum-royalty income of US$2 million. It is envisaged that

new products using ASTRI's technologies will be launched in the global consumer market in late 2012; and

(c) ASTRI has signed a research agreement with a Mainland company to jointly develop high speed data processing integrated circuits modules which are planned to be deployed in the communication system of China's High Speed Train.

28. ASTRI has also made good use of ITC's new programme "Promoting Innovation and Technology in the Public Sector" and collaborated with a number of government departments and public bodies to conduct test and trial of ASTRI's R&D results. Two examples are –

(a) Sample LED street-lamps have been installed at a Highways Department depot, Housing Department's estates in Tsz Wan Shan and Ma On Shan, and the Hong Kong Science Park. Evaluation of the trial results is under way; and

(b) In collaboration with Education Bureau, MyID, the first generation e-book developed by ASTRI, was put into trial use in more than 30 local schools and was well received by students and teachers. ASTRI's next generation e-book prototypes, together with e-learning management software, have been provided to schools participating in the Bureau's e-Learning pilot schemes.

RECOMMENDATIONS AND WAY FORWARD

29. Having regard to the above, we **recommend** that –

(a) for R&D Centres which meet the industry contribution target of 15% in their first five-year period i.e. NAMI and APAS, we will consider extending their operation beyond 31 March 2014 (viz. when their current approved funding expires) to allow them to plan their work on a longer horizon, noting that APAS will be merged with HKPC in due course. Further reviews of their performance will be conducted in good time;

(b) for the other two Centres i.e. HKRITA and LSCM which have not yet achieved an industry contribution of 15% in the first five years, we will set key performance indicators (e.g. increase in

industry contribution) and observe their performance for another two years and make recommendations on their future before the expiry of the current approved funding on 31 March 2014. Possible options include maintaining the status quo, disbandment, merger with an appropriate organization, etc.; and

(c) ASTRI has demonstrated an improving performance and its operation will continue to be funded under Government's annual recurrent subvention.

ADVICE SOUGHT

30. Subject to Members' advice, we will proceed to work out the detailed funding requirements and business plans for the Centres in the coming years. We shall consult Members again before putting up the funding proposal to FC for approval.

Innovation and Technology Commission
December 2011

Annex

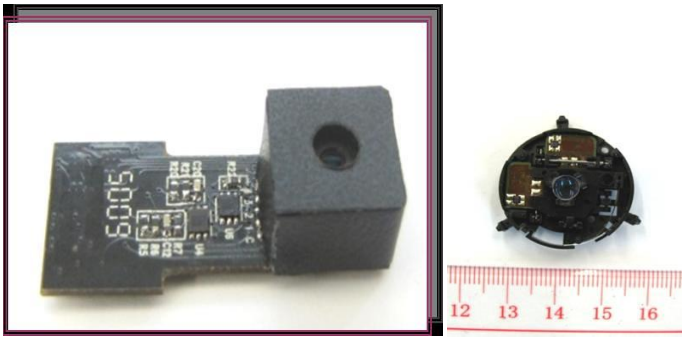
Latest Progress of R&D Centres in Commercialisation and Promotion of Use of R&D Deliverables in Public Sector

(A) Automotive Parts and Accessory Systems R&D Centre (APAS)

Project Name	Progress
Long Vehicle Wireless Backup Monitor System	A technology licence agreement has been signed in September 2011 with a Hong Kong auto parts manufacturer. Apart from an upfront licence fee of $50,000, APAS will receive additional royalty income from this project. 
Modified MyCar with Battery Management System (Correctional Services Department (CSD))	APAS in collaboration with CSD has launched a trial programme on a modified version of MyCar (which has incorporated a new lithium-ion battery pack plus APAS battery management system). The trial at CSD's facilities in Hei Ling Chau was completed in October 2011 and evaluation is under way. 

Project Name	Progress
Electric Vehicle (EV) Fast Charging Station (Electrical and Mechanical Services Department (EMSD))	APAS has developed an EV Smart Fast Charging Station and is working with EMSD to set up the charging station at its headquarters in Kowloon Bay for trial in January 2012. 
Vehicle Safety and Passenger Information Services System for Public Transportation (Transport Department (TD))	In collaboration with TD, APAS has launched a trial scheme to install the prototype in 18 green minibuses. The trial programme has begun in July 2011 and will continue until March 2012.   

(B) Hong Kong Applied Science and Technology Research Institute (ASTRI)

Project Name	Progress
Advanced Compact Camera Module (ACCM) for Cellular Phone Applications	The research team developed the world smallest anti-shaking compact camera module and demonstrated the module in various exhibitions and press conferences. The technology was awarded the Certificate of Merit in ICT Hong Kong in 2009. An exclusive licence agreement with royalty of $15.6M was signed in September 2010. 
LED Based Intelligent Outdoor Lighting System	The technology was awarded the Silver Award in ICT Hong Kong 2009. Seven licence agreements were signed in Hong Kong and the Mainland between September 2009 and March 2011. The LED outdoor lighting system was installed in the streets in Hong Kong and 7 major cities in the Mainland.  (Tuen Mun)  (Science Park)  (Hong Kong University of Science & Technology)

Project Name	Progress
TD-LTE Terminal Baseband Core	A technology licence agreement was signed with a leading IC company in the Mainland. ASTRI and the company jointly developed the world's first TD-LTE base band SoC for TD-LTE data card, and it was selected by China Mobile in its technical trial in 2010 Shanghai World Expo. Field trials in several major cities in the Mainland are under preparation.  
Modularized Ubiquitous Healthcare Electronics (MUHE)	Three licence agreements were signed between October 2009 and March 2011 for ASTRI's portable oximeter module. The team is currently finalizing 2 technology licence agreements.  

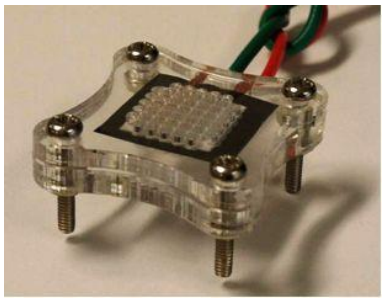
Project Name	Progress
Development and Commercialization of Key IC Packaging Technologies for Tire Pressure Monitoring System (TPMS)	ASTRI is working with a cargo terminal operation company to further develop TPMS on the Rubber-tyred Gantry implementation. The research team is working closely with 3 companies for commercialization in the Mainland. 
Multi-Role Configurable USB3.0 Application Processor (U3AP)	The first test chip (USB3.0 storage controller) under the project worked successfully with outstanding performance. ASTRI is working with the industry partner for mass production and compliance testing. 

Project Name	Progress
Telehealth Platform (United Christian Hospital (UCH))	The trial was conducted in UCH between July and October 2011. Further trial will be arranged in late 2012. There is interest from two companies for technology licensing. 
Ultimate e-Book for eLearning Open Research Platform for Learning Management System (Education Bureau (EDB))	<u>EDB Pilot Programme</u>: ASTRI has engaged local schools to provide eLearning total solution including learning management system, content bridge, software and eLearning device. The project team has started developing system software and e-Learning applications. A further version of mobile learning application has been developed for trial use by schools. <u>eLearning Device</u>: Project team has lined up a manufacturer to produce ASTRI eLearning device (PAL). The team has also collaborated with another manufacturer to verify the design and improve production yield. 

Project Name	Progress
	<u>eBook Standard</u>: New eReader version that supports category view, eLibrary feature and advance ePub features will be available. The project team is discussing with interested companies regarding eLearning Cloud. <u>eReading Programme</u>: Applications for participating in the programme have been reviewed and the selected schools will be notified.  

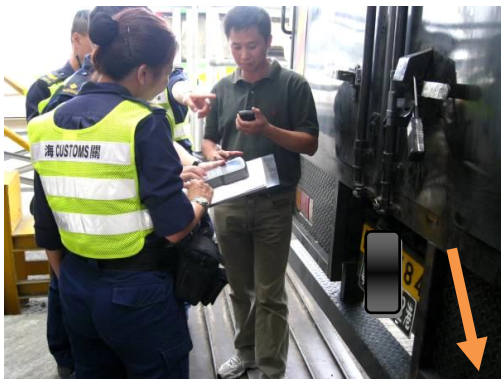
Project Name	Progress
Intelligent Sensing Lighting Control Module LED Lamp for Corridor Lighting Application (Housing Department)	Sample LED corridor lamps have been installed at public housing estates in Tsz Wan Shan and Ma On Shan. Evaluation of the trial is under way.  
LED Street-Lamp Deployment on Public Roads of Hong Kong (Highways Department (HyD))	Sample LED streetlamps have been installed at the depot of HyD and illumination performance is under evaluation. ASTRI will design new-generation high-efficient LED streetlamp specifically for HyD.  

(C) Hong Kong Research Institute of Textile and Apparel (HKRITA)

Project Name	Progress
Finer Nu-Torque Cotton Yarn Production (V1 to V4)	Three non-exclusive licences have been issued to companies for use of the Nu Torque™ Singles Ring Yarns Technology at a total licensing fee of $5M. Discussions are on-going with other interested companies.   
Novel Quick Testing Sensors of Formaldehyde in Textile Fabrics and Clothing Products	Manufacturing of trial sensor guns and industrial trial in fabric and garment factories commenced in November 2011.  

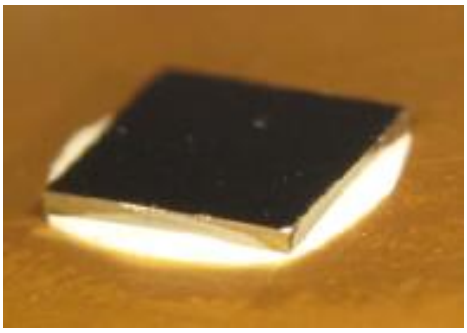
Project Name	Progress
Multi-function Odour-Control Uniform for Food and Environmental Hygiene Department (Food and Environmental Hygiene Department (FEHD))	Sample uniforms with special features have been produced for frontline staff in FEHD including odour-control, anti-bacteria and water-soil-blood-repellency. The trial run has been completed and evaluation is under way. 
Performance Sportswear Support for Hong Kong Sports Institute Elite Athletes in Olympic 2012 (Hong Kong Sports Institute)	Sample sportswear with special features to reduce muscle fatigue, enhance recovery and improve training and competition performance is being developed for the Hong Kong cycling and triathlon teams at the 2012 London Olympic Games.  

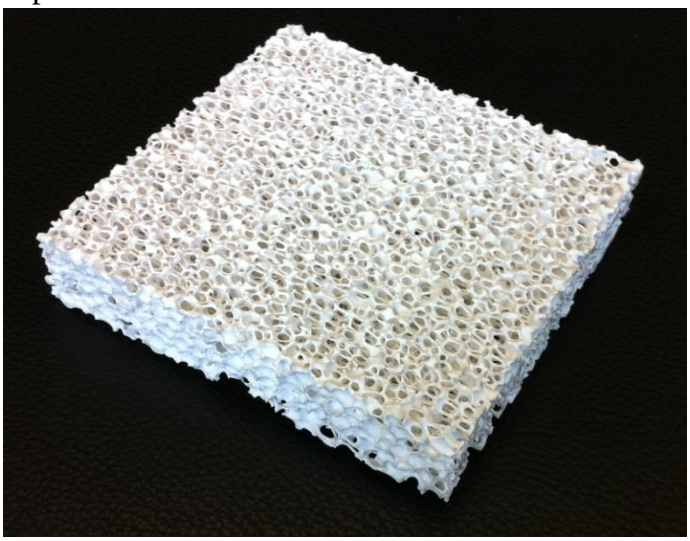
(D) Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies (LSCM)

Project Name	Progress
E-Lock-Based Enabling Technology for Container Cargo Transhipment Process (Customs and Excise Department (C&ED))	The project has commenced in October 2010. On-site and road tests were completed at the control points, including Man Kam To, Lok Ma Chau, Sha Tau Kok, Shenzhen Bay Port and the Airport. Trial run is being carried out for container/cargo truck tracking between Lok Ma Chau and the Airport.  Pilot testing at a control point E-Lock 

Project Name	Progress
RFID Traceability for Risk Management in Hospital – Prototype Implementation & Pilot Study in Prince of Wales Hospital (Prince of Wales Hospital)	The RFID system has been installed in two medical wards in the Prince of Wales Hospital. Trial is currently being conducted on medical equipment tracking, including oximeters, cardiac meters, infusion pumps, stretchers, wheel chairs, and oxygen cylinders.  
RFID and Sensor-based Productivity Enhancement System for Human-operated Workplace (Government & Industry) (Correctional Services Department (CSD))	Pilot trial run on using RFID technologies to monitor key chains will start in the first quarter of 2012 at CSD's facilities.  

(E) Nano and Advanced Materials Institute (NAMI)

Project Name	Progress
Development of Advanced Die Attach Adhesives with Nano-fillers/ Microcapsules for High Brightness LED	The product is undergoing field trial in Foshan to verify the thermal conductivity and reliability of the product. The product is expected to be ready for licensing in mid-2012. 
White Anodized Aluminium Oxide (AAO) Products	The formulation of white AAO on Al-6061 substrate has been finalized. Tests are being conducted to verify functional performance such as hardness, adhesion, etc. Results are expected by early 2012. A company has expressed interest in licensing the technology. 

Project Name	Progress
Research and Development for High Efficient Anti-Bacteria Porous Filters for use in Air Purifiers	Further anti-bacterial tests, including international standard method, and also in-house bacterial specific method are under way. The product is expected to be launched in late 2012. 
Enhanced Ductility and Service Life of Galvanized Structural Steel Members (Water Supplies Department (WSD))	The trial commenced in November 2010 at several WSD sites to evaluate the technology. The trial results will be reviewed in early 2012. 

Project Name	Progress
Research on High Efficiency Amorphous Si Solar Cells by Introducing New Functional Materials (Tseung Kwan O Hospital (TKOH))	Installation of the 10 kW solar cell demonstration system at TKOH was completed in September 2011. Functional test will be conducted in December 2011. 
Field Trial of Anti-Bacteria Coating for Disinfection Applications (United Christian Hospital (UCH))	An anti-bacteria coating will be coated on working surfaces (mainly computer keyboard) at UCH to evaluate its disinfectant capability in the hospital environment. The trial will commence in early 2012.