

For discussion
on 18 June 2012

**Legislative Council
Panel on Commerce and Industry**

**Progress Report on
Research and Development (R&D) Centres
for 2011-12**

PURPOSE

This paper is an annual update on the 2011-12 operation of the R&D Centres set up under the Innovation and Technology Fund (ITF).

BACKGROUND

2. In April 2006, the Administration set up five R&D Centres to drive and coordinate applied R&D in selected focus areas and to promote commercialization –

- (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) R&D Centre for Logistics and Supply Chain Management Enabling Technologies (LSCM); and
- (e) Nano and Advanced Materials Institute (NAMI).

3. In 2009, we undertook to conduct a full review on the operation and overall performance of the R&D Centres set up under the ITF for the first five-year period, taking full account of their experience in technology transfer and commercialization. On 20 December 2011, we briefed Members on the findings and recommendations of the review, and Members in general supported

the continued operation of the Centres. On 17 April 2012, we consulted Members again on the detailed funding proposals for extending the operation of APAS, HKRITA, LSCM and NAMI. (Note: the operating expenditure of ASTRI is funded separately by Government's annual recurrent subvention.) With the support of Members, the Finance Committee (FC) approved on 11 May 2012 -

- (a) extension of the operation of APAS and NAMI for three years up to 31 March 2017, and the operation of HKRITA and LSCM for one year up to 31 March 2015; and
- (b) an increase in the funding commitment by \$275.3 million to meet their operating expenditure.

4. Whilst we have provided in detail the 2011-12 operating statistics of the R&D Centres and our assessment on their overall performance in the context of past Panel/FC submissions, in accordance with the established mechanism, we still need to submit to the Panel an annual progress report on the performance of the Centres for 2011-12.

5. Highlights of the 2011-12 operation of the five R&D Centres are at Annexes A to E. At the coming meeting on 18 June 2012, we will ask the CEO of each Centre to make a short video presentation on the work of his Centre.

PROGRESS OF WORK IN 2011-12

(A) Operating Expenditure

6. The operating expenditure of the R&D Centres in 2010-11 and 2011-12 and their staffing situation (as at end-March 2012) are summarised as follows –

Operating Expenditure[#] and Staff Strength
(in \$million)

| | 2010-11 | 2011-12 | % change over 2010-11 | Staffing_Strength as at End-March 2012 [Establishment] |
|--------|---------|---------|--------------------------|--|
| APAS | 15.1 | 19.4 | +28% | 29 [33] |
| ASTRI | 113.4 | 122.7 | +8% | 586 [663] |
| HKRITA | 12.3 | 16.0 | +30% | 22 [27] |
| LSCM | 17.5 | 19.1 | +9% | 44 [55] |
| NAMI | 25.7 | 35.3 | +37% | 47 [69] |

After netting off administrative overhead for in-house R&D projects.

7. During 2011-12, APAS, HKRITA and NAMI stepped up their effort on both R&D projects and commercialization and this contributed to a significant increase in their operating expenditure. We envisage that ASTRI and LSCM would also increase their commercialization budget in the coming year.

(B) R&D Projects and Expenditure

8. The latest R&D programme of the R&D Centres are summarised as follows –

No. of New Projects Commenced in 2011-12
and No. of On-going Projects as at End-March 2012

| | No. of New Projects Commenced | | | No. of On-going Projects | | |
|--------|-------------------------------|---------|-----------------------------|--------------------------|-------------------|------------------------------|
| | 2010-11 | 2011-12 | % change over 2010-11 | As at Mar 2011 | As at Mar 2012 | % change over Mar 2011 |
| APAS | 10(5) | 6(2) | -40% | 23(5) | 18(3) | -22% |
| ASTRI | 44(4) | 27(4) | -39% | 63(6) | 51(6) | -19% |
| HKRITA | 10(0) | 14(2) | +40% | 26(1) | 24(2) | -8% |
| LSCM | 3(0) | 5(1) | +67% | 21(2) | 17(2) | -19% |
| NAMI | 14(6) | 15(5) | +7% | 34(12) | 29(9) | -15% |

Note 1: Under ITF, there are broadly two types of R&D projects:

- (i) platform projects which require industry contribution of at least 10% of the project cost. The industry sponsors (minimum of two) will not own the project intellectual property (IP); and
- (ii) collaborative projects which require industry contribution of at least 30% (for R&D Centre projects only) or 50% (for non-R&D Centre projects) of the project cost. The industry sponsor(s) will be entitled to utilize the project IP exclusively for a defined period or own the project IP.

Note 2: Figures in brackets denote the number of collaborative projects.

9. During 2011-12, the R&D Centres continued to embark on new projects, with a drop in number in the cases of APAS and ASTRI as they consolidated their existing work. This might also be due to the introduction of the more stringent vetting requirements under the new ITF Assessment Framework in the first half of 2011 after a review of the ITF mechanism. More emphasis is placed on ‘quality’ and not just ‘quantity’. Our Centres also attach greater importance to the need for commercialization/realization. The drop in the number of on-going projects is due to completion of projects and the lead time in embarking upon new projects.

10. As regards R&D expenditure, the situation is as follows -

| | <u>R&D Expenditure</u> (in \$million) | | |
|--------|--|---------|-----------------------|
| | 2010-11 | 2011-12 | % change over 2010-11 |
| APAS | 30.0 | 17.7 | -41% |
| ASTRI | 292.9 | 295.6 | +1% |
| HKRITA | 19.3 | 37.5 | +94% |
| LSCM | 41.4 | 48.0 | +16% |
| NAMI | 45.4 | 50.1 | +10% |

11. The 2011-12 R&D expenditure of HKRITA, LSCM and NAMI has increased, whilst ASTRI, being the more matured Centre, maintained a similar level of R&D expenditure as compared with 2010-11. Regarding APAS, its R&D expenditure dropped by 40% as a result of the withdrawal of industry sponsors in two collaborative projects due to change in circumstances.

However, we envisage that its R&D expenditure will pick up in the coming year as the Centre has finalised two new projects in April and May 2012 and they are expected to commence soon.

12. In general, as R&D is a more long-term process, a year for year difference should be viewed against a longer timeframe before casting a definitive view on the performance of a centre.

(C) Level of Industry Contribution Achieved

13. Industry contribution remains a most important performance indicator of the R&D Centres as it reflects the degree of industry interest in their work. The situation for 2010-11 and 2011-12 is summarised as follows –

Level of Industry Contribution in the Year
(based on approved funding commitment)(Note 1)

| | 2010-11 | 2011-12 |
|----------------|---------|---------|
| APAS | 28.1% | 13.9% |
| ASTRI (Note 2) | 20.3% | 20.2% |
| HKRITA | 12.3% | 23.0% |
| LSCM | 12.1% | 15.4% |
| NAMI | 41.1% | 35.9% |

Note 1: The level of industry contribution is calculated as follows –

$$\frac{\text{Industry Contribution Pledged}}{\text{Approved Project Expenditure}} \times 100\%$$

Note 2: Due to historical reason, ASTRI adopts a different method of calculating industry contribution.

14. The performance of NAMI continues to stand out among all R&D Centres. Both HKRITA and LSCM have also shown improvement in their industry contribution as they strived to meet the revised target of 18% for the two-year period ending 31 March 2013. The industry contribution of APAS dropped from 28.1% in 2010-11 to 13.9% in 2011-12, due mainly to the smaller number of new collaborative projects commenced whilst the Centre focused more on seed projects during 2011-12, including a few public sector trials (see paragraphs 11 and 12 above). However, taking into account the two new

projects approved in the current financial year, APAS has been able to achieve 29% of industry contribution in the first 14 months of the second 5-year period.

(D) Commercialization and Realization (i.e. Application in Public Sector)

15. The major progress of commercialization and realization under R&D Centre projects are set out in detail at Annexes A to E. Examples will be shown to Members during the video presentations.

LATEST POSITION ON IMPROVEMENT TO ITF MECHANISM

Extension of Public Sector Trials to All R&D Projects Under ITF

16. A separate but related development we would like to report to Members is that in the light of the good response of the public sector trial initiative (covering production of samples/prototypes and conducting of trial schemes), we propose to extend this from just projects undertaken by R&D Centres to all ITF-funded R&D projects.

17. In late 2010, we put forth a refined strategy to promote innovation and technology development. Having regard to views from Members and other stakeholders, we then extended the funding scope of ITF to cover production of prototypes/samples and conduct of trial schemes in the public sector (i.e. government departments, public bodies and trade associations). We hope this will help application of R&D results in the real world, observing their performance through actual practice (vs. just theoretical research), identifying areas of enhancement and have them implemented so that after ‘generation and generation’ of development, the R&D outcome can become products meeting the needs of ultimate clients. This will also provide a good reference for the products as they compete for business in the open market. As a general rule, such funding could be up to 30% of the original R&D project cost. However, in exceptional circumstances (e.g. great social value), flexibility can be exercised. On top of this, the companies will be encouraged to use their own money to make extra samples to be given to their own potential clients for trial to enhance the chance of commercialization.

18. At present, this initiative is only confined to projects undertaken by R&D Centres. This is because when we first introduced the initiative, we

wished to start with a narrower scope so as to have time/resources to observe the results and fine-tune the arrangements.

19. Since the launch of this initiative, R&D Centres have been working closely with different Government departments, public bodies and trade associations to actively explore opportunities of collaboration. Response has been very encouraging. As at end-April 2012, we have embarked over 30 such projects. These include for example –

- (a) Installation of vehicle safety and passenger information services devices on green minibuses (APAS)
- (b) e-Book for e-Learning (ASTRI);
- (c) Performance sportswear support for the Hong Kong Sports Institute elite athletes (HKRITA);
- (d) E-Lock based enabling technology for container cargo transshipment process for the Customs and Excise Department (LSCM); and
- (e) Installation of 10kW solar cell demonstration system at Tseung Kwan O Hospital (NAMI).

20. In the light of the good response, we consider it is now time to extend the initiative from just R&D Centres to all R&D projects funded under ITF. This will then cover projects undertaken by all designated local public research institutions under the Innovation and Technology Support Programme as well as projects under the University-Industry Collaboration Programme and Small Entrepreneur Research Assistance Programme. We will adopt the existing application and monitoring mechanism and fine-tune as fit.

21. There have also been enquiries in the past as to whether trial schemes can be conducted outside Hong Kong so as to enlarge the clientele and establish credibility internationally (e.g. field use of a LED technology developed by ASTRI in a city in the Mainland with the support of the local government; trial of a new medical device in a hospital in Beijing, etc.).

Indeed innovation and technology is an area which we should not limit to just the local setting as the larger the degree of Mainland/international exposure/collaboration, the greater the chance of success, and that is the reason why at present we already allow up to 50% of the R&D work of an ITF project to be conducted (and relevant expenditure incurred) outside Hong Kong. We hence propose to allow trial schemes to be conducted outside Hong Kong and in the public sector of the economies concerned. This must be within reasonable limits and in general, should not exceed half of the funding provision allowed for trial schemes in a particular project (i.e. as up to 30% of the original R&D project cost can be used to conduct such trials, this would mean not exceeding 15% - see paragraph 17 above).

22. As R&D Centres have already established good working relationship with Government departments/public bodies/trade associations, relating to their areas of expertise, they will in future render support in linking up parties concerned (e.g. university professors, SMEs, etc.) as fit. This will enable them to further act as the focal point of liaison/contact in the trade which is one of the original purposes of setting up R&D Centres.

ADVICE SOUGHT

23. Members are invited to advise on the above.

**Automotive Parts and Accessory Systems R&D Centre (APAS)
Highlight of Operation in 2011-12**

I. New R&D Projects and Industry Contribution (in \$million)

| | <u>2010-11</u> | | | <u>2011-12</u> | | |
|----------------------|---------------------|--------------|-----------------------|---------------------|--------------|-----------------------|
| | No. of new projects | Project Cost | Industry Contribution | No. of new projects | Project Cost | Industry Contribution |
| Platform | 5 | 17.2 | 1.8 (10.5%) | - | - | - |
| Collaborative | 5 | 14.1 | 7.0 (49.6%) | 2 | 3.21 | 0.97 (30.2%) |
| Seed | - | - | n/a | 2 | 3.75 | n/a |
| Total: | 10 | 31.3 | 8.8 (28.1%) | 4 | 6.96 | 0.97 (13.9%) |
| Public Sector Trials | - | - | - | 2 | 0.93 | n/a |

Note: Figures in brackets denote the level of industry contribution.

II. Operating Expenditure (in \$million)

| | 2010-11 | 2011-12 |
|---------------|---------|---------|
| Staffing | 6.8 | 13.0 |
| Accommodation | 1.5 | 1.5 |
| Equipment | 5.9 | 2.5 |
| Others | 0.9 | 2.4 |
| Total: | 15.1 | 19.4 |

III. Industry Income Received (in \$million)

| | 2010-11 | 2011-12 |
|--------------------------|---------|---------|
| Sponsorship for projects | 4.62 | 3.24 |
| Licensing/Royalty | - | 0.05 |
| Contract services | - | - |
| Others | 0.34 | 0.15 |
| Total: | 4.96 | 3.44 |

IV. Progress of Commercialization and Use of R&D Deliverables in Public Sector

| Project Name | Status / Progress |
|--|--|
| <p data-bbox="204 450 751 562">Development of Electronic Control Unit for Power Management Platform of EV</p>   | <p data-bbox="774 450 1375 799">A MyCar installed with a battery management system and lithium battery pack developed by APAS was put on trial at Correctional Services Department's Hei Ling Chau facilities in the second half of 2011. The results are being evaluated. Another trial at the Hong Kong International Airport started in March 2012.</p> |
| <p data-bbox="204 1305 751 1379">20kW Fast Charging Station with Professional E-payment System</p>  | <p data-bbox="774 1305 1375 1458">On-site trial of the fast charging station is underway at Electrical and Mechanical Services Department's headquarters and a local auto company.</p> |

| Project Name | Status / Progress |
|---|--|
| <p data-bbox="204 304 751 421">A Prototype of Vehicle Safety and Passenger Information Services: a Road Trial Run Programme</p>  | <p data-bbox="774 304 1374 443">Prototypes had been installed on 12 Green Minibuses on 9 routes in mid-2011 for trial.</p> |
| <p data-bbox="204 819 751 898">Long Vehicle Wireless Backup Monitor System</p>  | <p data-bbox="774 819 1374 1055">A technology licence has been granted to a local company at a fee of \$35,000. Separately, four government departments have installed the prototypes on their vehicles for trial.</p> |

Details of the R&D projects undertaken by APAS are available at http://www.apas.hk/index.php?option=com_content&view=article&id=9&Itemid=18&lang=en.

Automotive Parts and Accessory Systems R&D Centre
June 2012

**Hong Kong Applied Science and Technology Research Institute (ASTRI)
Highlight of Operation in 2011-12**

I. R&D Projects and Industry Contribution (in \$million)

No. of Projects
(Including projects completed during the year)

| | <u>2010-11</u> | | <u>2011-12</u> | |
|---------------|-----------------|--------------|-----------------|--------------|
| | No. of projects | Project Cost | No. of projects | Project Cost |
| Platform | 63 | 233.1 | 58 | 252.3 |
| Collaborative | 9 | 30.0 | 10 | 23.1 |
| Seed | 29 | 29.8 | 22 | 20.2 |
| Total: | 101 | 292.9 | 90 | 295.6 |

Industry Contribution

| | <u>2010-11</u> | | <u>2011-12</u> | |
|--------------------|----------------|-----------------------|----------------|-----------------------|
| | Project Cost | Industry Contribution | Project Cost | Industry Contribution |
| Platform | 233.1 | 30.3 (12.6%) | 252.3 | 36.4 (14.1%) |
| Collaborative | 30.0 | 13.8 (44.5%) | 23.1 | 7.1 (32.9%) |
| Seed | 29.8 | n/a | 20.2 | n/a |
| Contract Research | - | 5.5 (100%) | - | 6.8 (100%) |
| Royalty and Others | - | 11.4 | - | 10.6 |
| Total: | 292.9 | 61.0 (20.3%) | 295.6 | 60.9 (20.2%) |

Note: Due to historical reason, income from contract research, licensing and royalty is also counted towards the calculation of industry contribution. The project cost includes accrual adjustments in the following year (\$7.3M and \$5.2M for 2010-11 and 2011-12 respectively).

II. Operating Expenditure (in \$million)

| | 2010-11 | 2011-12 |
|---------------|---------|---------|
| Staffing | 64.0 | 69.8 |
| Accommodation | 20.0 | 22.1 |
| Equipment | 2.2 | 6.2 |
| Others | 27.2 | 24.6 |
| Total: | 113.4 | 122.7 |

III. Industry Income Received (in \$million)

| | 2010-11 | 2011-12 |
|--------------------------|---------|---------|
| Sponsorship for projects | 44.1 | 43.5 |
| Licensing/Royalty | 10.7 | 10.2 |
| Contract services | 5.5 | 6.8 |
| Others | 0.7 | 0.4 |
| Total: | 61.0 | 60.9 |

IV. Progress of Commercialization and Use of R&D Deliverables in Public Sector

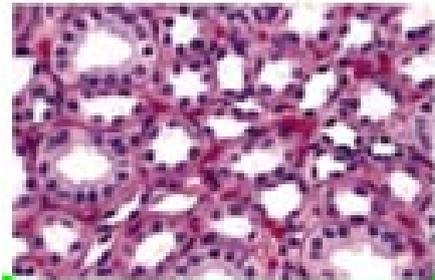
| Project Name | Status/Progress |
|--|--|
| <p>TD-LTE Terminal Baseband Core</p>  <p>TD-LTE Data Card developed by ASTRI and industry partner 由應科院與合作夥伴共同開發的 TD-LTE 數據卡</p> | <p>A technology licensing agreement and a contract service agreement were signed with a leading IC company in the Mainland and a leading testing equipment company in Germany respectively. ASTRI and the Mainland licensee jointly developed the world's first TD-LTE baseband SoC for TD-LTE data card, and it was demonstrated at the 2010 Shanghai World Expo. The further enhanced TD-LTE data card has been selected by China Mobile for large-scale field trials in several major cities in the Mainland.</p> |

| Project Name | Status/Progress |
|--|--|
|  | <p>TD-LTE Propagation Study and Cell Planning R&D was completed with the participation of Hong Kong Science & Technology Parks. In May 2011, two TD-LTE base stations were constructed and deployed. Tests have been done for deployment and throughput evaluation in various propagation environments. The project team continued to use the existing sites to test ASTRI's new releases of TD-LTE user equipment. A 4G Internet Kiosk was also set up in the Hong Kong Science Park for demonstration and testing purposes.</p> |
| <p>LTE TDD/FDD Dual Mode Baseband Cores</p>  | <p>Two contract service agreements were signed with a global leading base station chipset and platform provider. A technology licensing agreement was signed in November 2011 with a leading wireless IC and solution provider in the Mainland.</p> <p>ASTRI has received more than \$1 million in royalty under this project.</p> |
| <p>LTE Release 9 Evolution and Performance Enhancement</p>  | <p>A technology licensing agreement was signed with a leading wireless IC and solution provider in the Mainland on LTE Terminal Baseband Cores and another contract service agreement was signed with a leading global base station chipset and platform provider in LTE Femto BTS based products. The team successfully launched the first commercial-grade LTE femtocell physical layer software in the industry and demonstrated at Mobile World Congress 2012 in Barcelona, Spain.</p> <p>The world's first FDD/TDD LTE packet-switched handover test was completed using the dual mode USB data card developed by ASTRI and related infrastructure.</p> |

| Project Name | Status/Progress |
|---|--|
| <p>Reconfigurable RF</p>    | <p>A licensing agreement regarding RF jamming technology was signed for road toll application in 2010. Several RF jamming devices have been developed and field testing is in-progress. Another licensing agreement on the antenna for hand-held direction finding device was signed with a US company.</p> <p>In addition, 13 contract service agreements were signed with eight companies regarding the technology for reconfigurable repeater reference design and antenna design services.</p> |
| <p>Ultimate e-Book for e-Learning; and Open Research Platform for Learning Management System</p>  | <p><u>e-Learning Solutions</u></p> <p>Three licensing agreements and six service contracts were signed with eight companies in 2011 and 2012 to utilize the technologies developed from the various e-Learning projects. ASTRI has also arranged trial engagements with twenty primary and secondary schools participating in various e-Learning programs, funded by the Education Bureau (EDB) or the IT industry. The e-Book device has been deployed in three pilot schools under EDB's e-Learning pilot program and 68 schools under the e-Reading program, while eight schools have installed the Learning Management System (LMS) for trials.</p> |

| Project Name | Status/Progress |
|---|--|
|  | <p><u>EDB Pilot Program:</u></p> <p>The 3-year e-Learning pilot scheme started in September 2011. ASTRI engaged with four school clusters consisting of 18 schools participating in the program and deployed its e-Learning solution in these schools in stages. The solution includes Learning Management System, e-Learning device (PAL-Personal Assistant for Learning) and client software applications.</p> <p><u>Mobile e-Learning Program</u></p> <p>ASTRI also organizes mobile e-Learning activities for the participation of local schools by offering technologies such as e-Learning device as well as client-side and server-side software. In collaboration with Po Leung Kuk, Digital Travel events were hosted during InnoCarnival in November 2011. The events have 14 schools participating. Furthermore, ASTRI offers the whole suite of technologies for schools to stage their own mobile e-Learning activities, in collaboration with EDB.</p> <p><u>e-Reading Program</u></p> <p>Around 200 guests from schools, publishers, EDB, ITC and media attended the event. The team distributed about 1,000 e-Reading devices to 68 schools that applied for the program, with the initial lot of books donated by publishers. ASTRI is also working with the publishers for a second round of involvement in the program, including development of a system that lets school libraries purchase books from publishers.</p> |

| Project Name | Status/Progress |
|--|--|
| <p data-bbox="193 331 724 405">Integrated LCoS Imager IP Development For Pico-projectors</p>  | <p data-bbox="750 331 1401 443">A licensing agreement with a leading Liquid Crystal on Silicon (LCoS) supplier was executed in 2011-12.</p> |
| <p data-bbox="193 678 724 752">LCD TV Display Enhancement Controller</p>  | <p data-bbox="750 678 1401 902">A licensing agreement regarding “Real-time 2D-3D Conversion Technology” was signed with a US company in 2011. The end application is an external real-time 2D-to-3D hardware converter box. The product has been launched in the market since 2011.</p> |
| <p data-bbox="193 1043 724 1120">LED Based Intelligent Outdoor Lighting System</p>  | <p data-bbox="750 1043 1401 1279">Technology licensing agreements were signed with three lighting manufacturing companies located in both Hong Kong and the Mainland. These manufacturing lamps have been installed in seven cities in the Mainland already.</p> <p data-bbox="750 1339 1401 1413">Trials are on-going with the participation of the following –</p> <ul data-bbox="750 1429 1401 1995" style="list-style-type: none"> - LED lamp trial deployment and research performance evaluation in Hong Kong Science Park; - LED streetlamp deployment on Public Roads of Hong Kong - Highways Department: ASTRI is preparing a new generation of LED streetlamp for evaluation by the Department; - LED streetlamp for Tseung Kwan O Hospital Expansion project with Architectural Services Department; and - Intelligent sensing lighting control module and LED lamp for corridor lighting application in Housing Authority. |

| Project Name | Status/Progress |
|--|---|
| <p data-bbox="193 378 722 495">Development and Commercialization of Key IC Packaging Technologies for Tire Pressure Monitoring System</p>    | <p data-bbox="751 378 1401 533">ICEPT-HDP 2011 Best Paper Award was received. With the competency developed from the project, three service contracts were signed at a total value over \$1.5M.</p> |
| <p data-bbox="193 1507 722 1579">High Speed Digital Pathology System</p>  | <p data-bbox="751 1514 1401 1668">An agreement was signed in February 2012 with a Hong Kong company to develop modules for high-speed digital pathology system.</p> <p data-bbox="751 1704 1401 1977">A trial scanning with Virtual Microscope system using trial pathology slide was completed in May 2011 for Queen Mary Hospital. A new version of commercial slide scanner will be installed in April 2012 at Queen Mary Hospital. A large-scale trial is under planning.</p> |

| Project Name | Status/Progress |
|---|---|
| <p>Convenient login device for doctors/nurses to login HA main system (United Christian Hospital (UCH))</p> | <p>Trial of ASTRI's "Proximity-Based Biometric Identification System" at UCH was completed in January 2012. Evaluation is in progress.</p> |
| <p>Medical Infotainment for Pediatric Ward (UCH)</p> | <p>A prototype solution was completed using ASTRI HD Set-top-box (STB) and PC in February 2011. The trials for STB, user interface and content management software were held in 2011-12.</p> <p>Two iPad devices and two sets of ASTRI HD STB system are installed in the Pediatric Ward of UCH for trial.</p> |
| <p>Intelligent Mobile Surveillance Technology Platform (Hong Kong Police Force)</p>  | <p>ASTRI has built a mobile surveillance device prototype, and performed trial in the Mainland in 2011.</p> <p>Three customized research contracts based on this platform technology were signed.</p> <p>ASTRI has tried the device in Shenzhen, and the video transmission from China Telecom mobile to China Telecom ADSL broadband is good.</p> <p>Field trial with Hong Kong Police Force started in November 2011.</p> |
| <p>Clustering based video summary and retrieval system</p>  | <p>Project deliverables were displayed at 2011 China High Tech Fair, the 5th China (Shenzhen) International Investment & Trade Fair 2012, and International Innovative Project & Financing Matchmaking Symposium.</p> |

| Project Name | Status/Progress |
|--|---|
| <p data-bbox="193 331 724 495">Modularized Ubiquitous Healthcare Electronics (Senior Citizen Home Safety Association (SCHSA), UCH)</p>  | <p data-bbox="750 338 1401 495">ASTRI are working with SCHSA on the possibility of integrating the healthcare module with the safety alarm of SCHSA to provide value-added functions to the elderly.</p> <p data-bbox="750 533 1401 645">A user interface has been developed and sent to SCHSA for internal testing. Positive feedbacks have been received.</p> <p data-bbox="750 683 1401 840">One contract has been signed with SCHSA in February 2012 for the development of the aggregator for collecting health related information.</p> |
| <p data-bbox="193 884 724 996">LED based Belisha Beacon (BB) Lamp with Transport Department (TD)</p>  | <p data-bbox="750 891 1401 1086">ASTRI and TD jointly measured the higher luminous LED lamps developed by ASTRI at TD's laboratories. ASTRI will build new reference design of LED light bulb prototype samples for BB application.</p> <p data-bbox="750 1124 1401 1281">ASTRI is conducting trials of LED based BB lamps in the MTR University Station. Further trial of different locations will be considered.</p> |

Details of the projects undertaken by ASTRI are available at <http://www.astri.org/main/index.php?contentnamespace=technologies:home>.

Hong Kong Research Institute of Textile and Apparel (HKRITA)
Highlight of Operation in 2011-12

I. New R&D Projects and Industry Contribution (in \$million)

| | <u>2010-11</u> | | | <u>2011-12</u> | | |
|----------------------|---------------------|--------------|-----------------------|---------------------|--------------|-----------------------|
| | No. of new projects | Project Cost | Industry Contribution | No. of new projects | Project Cost | Industry Contribution |
| Platform | 10 | 38.9 | 4.8 (12.3%) | 6 | 15.78 | 2.20 (13.9%) |
| Collaborative | - | - | - | 2 | 5.28 | 2.64 (50.0%) |
| Seed | - | - | n/a | - | - | n/a |
| Total: | 10 | 38.9 | 4.8 (12.3%) | 8 | 21.06 | 4.84 (23.0%) |
| Public sector trials | - | - | - | 6 | 7.02 | n/a |

Note: Figures in brackets denote the level of industry contribution.

II. Operating Expenditure (in \$million)

| | 2010-11 | 2011-12 |
|---------------|---------|---------|
| Staffing | 9.7 | 11.8 |
| Accommodation | 0.5 | 1.3 |
| Equipment | 0.1 | - |
| Others | 2.0 | 2.9 |
| Total: | 12.3 | 16.0 |

III. Industry Income Received (in \$million)

| | 2010-11 | 2011-12 |
|--------------------------|---------|---------|
| Sponsorship for projects | 12.59 | 3.67 |
| Licensing/Royalty | 5.19 | 0.57 |
| Contract services | - | - |
| Others | - | - |
| Total: | 17.78 | 4.24 |

IV. Progress of Commercialization and Use of R&D Deliverables in Public Sector

| Project Name | Status/Progress |
|---|--|
| <p>Finer Nu-Torque Cotton Yarn Production</p>  | <p>Non-exclusive licenses have been granted to several companies, increasing the total licensing income about \$7 million.</p> |
| <p>Advanced Clothing Functional Design CAD Technologies (I) & (II)</p> | <p>Two non-exclusive licenses have been granted at a fee of \$100,000 in 2011-12.</p> |
| <p>Fabric Sensors for Three Dimensional Surface Pressure Mapping</p> | <p>One non-exclusive license has been granted at a fee of \$40,000 during 2011-12.</p> |
| <p>Novel Finishing Treatment for Knitwear Using Low Temperature Rapid Evaporation</p> | <p>One non-exclusive license has been granted at a fee of \$20,000 during 2011-12.</p> |
| <p>Development of Shape Memory Knitted Fabrics/Garments</p> | <p>One non-exclusive license has been granted at a fee of \$500,000 during 2011-12.</p> |
| <p>Multi-function Odour-Control Uniform for Food and Environmental Hygiene Department of HKSAR Food and Environmental Hygiene Department (FEHD)</p> | <p>Trial of prototype uniforms for the frontline staff handling corpses has been completed.</p> |

| Project Name | Status/Progress |
|---|---|
| <p>Performance Sportswear Support for Hong Kong Sports Institute Elite Athletes Hong Kong Sports Institute</p>  | <p>Prototypes of high performance sportswear have been in trial use by the cycling and triathlon teams of Hong Kong Sports Institute.</p> |
| <p>Monitoring Patients with Diabetic Foot Syndrome by Intelligent Footwear System Hospital Authority (HA)</p> <p>Prototype of footwear system : V1.3 Intelligent footwear</p>  <p>Side look (Shoe No. is marked on the ribbon)</p> <p>Insole and DAQ system</p> | <p>The trial is being conducted in a public hospital until August 2012.</p> |
| <p>Functional Design Optimization of Hong Kong Fire Service Uniform Fire Services Department (FSD)</p> | <p>40 sets prototypes of FSD Uniform No. 3 will be developed for field-wear trial in Q3 2012.</p> |
| <p>Adult Bibs for Elderly Care Home Local elderly care homes</p> | <p>Adult-bib prototypes have been developed and are under trial at two local elderly care homes.</p> |
| <p>Development of Innovation Apparel Products and Evaluation Technology for CSD Uniform Apparels Correctional Services Department (CSD)</p> | <p>The trial is planned to commence in late 2012.</p> |

| Project Name | Status/Progress |
|--|--|
| Commercialisation of Smart Pressure Monitored Suits (SPMS) for Managing Hypertrophic Scar Hospital Authority (HA) | Trial of SPMS at two public hospitals commenced in May 2012. |
| Development of sprain-free sport shoe: prototype version Hospital Authority (HA) | Prototype with the modified anti-sprain device embedded in sports leggings will be under trial at a public hospital and a local university in late 2012. |

Hong Kong Research Institute of Textile and Apparel
June 2012

**R&D Centre for
Logistics and Supply Chain Management Enabling Technologies (LSCM)
Highlight of Operation in 2011-12**

I. New R&D Projects and Industry Contribution (in \$million)

| | <u>2010-11</u> | | | <u>2011-12</u> | | |
|----------------------|---------------------|--------------|-----------------------|---------------------|--------------|-----------------------|
| | No. of new projects | Project Cost | Industry Contribution | No. of new projects | Project Cost | Industry Contribution |
| Platform | 3 | 28.0 | 3.4 (12.1%) | 2 | 13.58 | 1.67(12.3%) |
| Collaborative | - | - | - | 1 | 1.20 | 0.60 (50.0%) |
| Seed | - | - | n/a | - | - | n/a |
| Total: | 3 | 28.0 | 3.4 (12.1%) | 3 | 14.78 | 2.27(15.4%) |
| Public sector trials | - | - | - | 2 | 5.61 | n/a |

Note: Figures in brackets denote the level of industry contribution.

II. Operating Expenditure (in \$million)

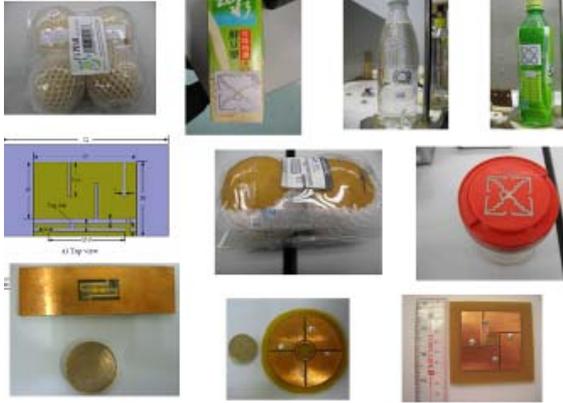
| | 2010-11 | 2011-12 |
|---------------|---------|---------|
| Staffing | 10.3 | 11.4 |
| Accommodation | 3.6 | 3.8 |
| Equipment | 0.5 | 0.3 |
| Others | 3.1 | 3.6 |
| Total: | 17.5 | 19.1 |

III. Industry Income Received (in \$million)

| | 2010-11 | 2011-12 |
|----------------------|---------|---------|
| Sponsorship projects | 7.96 | 3.80 |
| Licensing/Royalty | 0.002 | 0.065 |
| Contract services | - | - |
| Others | 0.13 | - |
| Total: | 8.092 | 3.865 |

IV. Progress of Commercialization and Use of R&D Deliverables in Public Sector

| Project Name | Status/Progress |
|---|--|
| <p>Interoperability Technology and Applications for Container RFID and e-seal</p>  | <p>The “Active RFID container management system for River Trade” has been licensed to a company at annual license fee of \$40,000.</p> <p>A company has been licensed the “Interoperable Site Server” developed under this project at a license fee of \$15,000.</p> |
| <p>RFID-enabled Platform Technology for the Integrated Shenzhen-Hong Kong Food Safety and Supply Chain Management Public Information Platform</p>  | <p>A company has been licensed at a license fee of \$50,000.</p> <p>A public sector trial project is also in progress with the support of Hong Kong Food Council.</p> |

| Project Name | Status/Progress |
|--|---|
| <p data-bbox="188 338 793 416">Package-specific RFID Tagging and Embedding Technology</p>  <p data-bbox="193 853 751 887"><u>Various package-specific RFID antenna design</u></p>  <p data-bbox="193 1267 767 1301"><u>RFID antenna printing using conductive ink</u></p> | <p data-bbox="815 338 1390 450">A public sector trial will start in 2012 with the support of Hong Kong Film Archive.</p> |
| <p data-bbox="188 1395 793 1473">Low Cost Versatile Tracking Device and Technology Industry</p>  <p data-bbox="212 1895 793 1973"><u>Tracking devices for warehouse management</u></p> | <p data-bbox="815 1395 1390 1552">A local System Integrator (SI) company has been licensed for further developing the technology. LSCM will receive 10% of the sales revenue generated.</p> |

| Project Name | Status/Progress |
|---|--|
| <p data-bbox="188 338 793 510">E-Lock-Based Enabling Technology for Container Cargo Transshipment Process (Customs and Excise Department (C&ED))</p> <p data-bbox="300 528 681 555">LSCM Technology Enabling C&ED's ITFS</p> <p data-bbox="213 573 628 595">e.g. E-lock enabled operations – Northbound Air-land Cargo</p>  <p data-bbox="213 927 568 963"><u>An E-locked Enabled ITFS</u></p>  | <p data-bbox="815 338 1388 611">C&ED has also adopted the cargo tracking platform into its Intermodal Transshipment Facilitation Scheme (ITFS) which reduces the number of Customs inspection on the cargoes at the entry control points and speeds up logistics flow.</p> <p data-bbox="815 633 1388 869">Trial runs have been successfully conducted between controls points of C&ED including Man Kam To, Lok Ma Chau, Sha Tau Kok, Shenzhen Bay Port and Hong Kong International Airport. Evaluation is under way.</p> |

| Project Name | Status/Progress |
|---|--|
| <p data-bbox="204 304 804 434">RFID Traceability for Risk Management in Hospital (Prince of Wales Hospital)</p>  <p data-bbox="384 719 539 734">A patient wearing a Wristband Tag</p> <p data-bbox="400 987 555 1003">Tying equipment tags on Wheelchairs</p> | <p data-bbox="831 304 1398 456">Trials on tracking medical equipment and personnel were completed with positive feedback from the hospital. Evaluation is in progress.</p> |

**Nano and Advanced Materials Institute (NAMI)
Highlight of Operation in 2011-12**

I. New R&D Projects and Industry Contribution (in \$million)

| | <u>2010-11</u> | | | <u>2011-12</u> | | |
|-------------------|---------------------|--------------|-----------------------|---------------------|--------------|-----------------------|
| | No. of new projects | Project cost | Industry contribution | No. of new projects | Project cost | Industry contribution |
| Platform | 5 | 19.9 | 2.1(10.6%) | 3 | 7.33 | 0.74(10.1%) |
| Collaborative | 6 | 52.9 | 29.4(55.6%) | 5 | 43.56 | 22.04(50.6%) |
| Seed | 3 | 3.9 | n/a | 7 | 12.47 | n/a |
| Total: | 14 | 76.7 | 31.5(41.1%) | 15 | 63.36 | 22.78(35.9%) |
| Contract Research | - | - | - | 2 | 0.11 | 0.11(100%) |

Note: Figures in brackets denote the level of industry contribution.

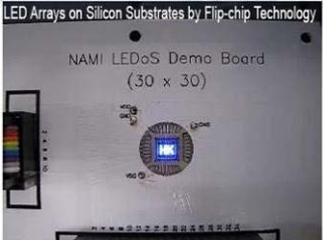
II. Operating Expenditure (in \$million)

| | 2010-11 | 2011-12 |
|---------------|---------|---------|
| Staffing | 19.0 | 26.0 |
| Accommodation | 4.2 | 2.4 |
| Equipment | 0.6 | 0.5 |
| Others | 1.9 | 6.4 |
| Total: | 25.7 | 35.3 |

III. Industry Income Received (in \$million)

| | 2010-11 | 2011-12 |
|--------------------------|---------|---------|
| Sponsorship for projects | 33.52 | 7.57 |
| Licensing/Royalty | 0.04 | - |
| Contract Research | - | 0.11 |
| Others | - | - |
| Total: | 33.56 | 7.68 |

IV. Progress of Commercialization and Use of R&D Deliverables in Public Sector

| Project Name | Status/Progress |
|--|---|
| <p>Development of Reactive Hybridization SOL-GEL Technology on Extra Hard and Non-Stick Silicon Coating as an Alternative to Teflon Coating for Cookware</p>  | <p>A company has been granted a licence in 2011 on the commercialisation of the cookware products at a fee of \$30,000.</p> |
| <p>LED Arrays on Silicon Substrates by Flip-chip Technology</p>  | <p>The technology is being further developed for display applications in addition to pico-projector. The associated development such as drivers, improved resolution, etc. will be considered. A local company has indicated interest in using the technology. Licensing Agreement will be concluded shortly.</p> |
| <p>Development of Advanced Die Attach Adhesives with Nano-fillers/ Microcapsules for High Brightness LED</p>  | <p>The product is undergoing field trial to further verify the reliability of the product. A company has been granted a license for using the technology at a fee of \$100,000.</p> |

| Project Name | Status/Progress |
|---|--|
| <p>Multifunctional Environmental Paint for Wooden Furniture Based on Organosilica Nanosol and Nanomaterial Additives</p>  | <p>NAMI developed a high performance environmental paint to replace existing solvent-based paints which may contain hazardous ingredients (e.g. volatile organic chemicals, heavy metals). The new generation paint with nanomaterial and functional additives offers technological superiority in water resistance, fire resistance, antibacterial capability, short drying time and functional tunability, as well as low cost manufacturing processes. Licensing agreement expected to be concluded shortly.</p> |
| <p>Enhanced Ductility and Service Life of Galvanized Structural Steel Members (Water Supplies Department (WSD))</p>  | <p>Steel hangers/brackets, with half galvanized with conventional method, and the other half galvanized with nano-additives, were installed in November 2010 at the following corrosive environments at WSD:</p> <ul style="list-style-type: none"> • Chlorination plant room at Red Hill Water Treatment Works; • Electrochlorination plant room at Sai Wan Ho Salt Water Pumping Station; and • Salt water pump hall at Sai Wan Ho Salt Water Pumping Station. <p>Evaluation is underway.</p> |
| <p>Research on High Efficiency Amorphous Si Solar Cells by Introducing New Functional Materials (Architectural Services Department)</p>  | <p>A 10kW solar cell demonstration system has been installed at Tseung Kwan O Hospital. The system commenced operation in March 2012.</p> |

| Project Name | Status/Progress |
|--|---|
| <p>Field Trial of Anti-bacteria Coating for Disinfection Applications (United Christian Hospital (UCH))</p> <p>Field Trial of Anti-bacteria Coating for Disinfection Applications</p>  <p>With antibacterial coating Without antibacterial coating</p>  <p>1) Sample collection 2) Sample transfer 3) Sample dilution</p> | <p>The field trial of a NAMI developed anti-bacterial coating at UCH commenced on 3 January 2012. The coating is applied on working surfaces (mainly computer keyboards) at UCH to evaluate its disinfection capability in a hospital environment.</p> <p>Evaluation is underway.</p> |

Details of the R&D projects undertaken by NAMI are available at http://www.nami.org.hk/clb_rnd_e.html.

Nano and Advanced Materials Institute
June 2012