創新意念，締造市場
From Minds to Markets

Annual Report 2009/2010 年報

Hong Kong Applied Science and Technology Research Institute Company Limited
香港應用科技研究院有限公司

Mission and Goals
使命與目標

ASTRI's mission is to enhance Hong Kong's competitiveness in technology-based industries through applied research. Its goals are:
應科院的使命是要透過應用研究協助發展以科技為基礎的產業，藉此提升香港的競爭力。其目標包括：

- Performing relevant and high quality R&D for transfer to industry;
  進行相關及高質素的科技研究發展工作，並把科研成果轉移給工業界；
- Enhancing Hong Kong's technological human resources development;
  增強本港科技人才的實力；
- Acting as a magnet attracting international R&D talents to work in Hong Kong;
  吸引海外從事研究發展的專才來港工作；
- Acting as spawning ground for technology entrepreneurs;
  培育科技企業家；
- Promoting greater technological applications in industry; and
  鼓勵將科技廣泛應用於工業方面；及
- Providing a focal point for industry-university collaboration.
  作為工業界與大學合作的橋樑。

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Major Milestones
里程碑

January 2000 二零零零年一月
The HKSAR Government established ASTRI
香港特區政府成立應科院

2001 二零零一年
ASTRI started operation
應科院開始運作

May 2001 二零零一年五月
The Hong Kong Jockey Club Institute of Chinese Medicine was established as a subsidiary
成立子公司香港賽馬會中藥研究院

October 2002 二零零二年十月
Filed the first U.S. patent application
遞交首個美國專利申請

June 2003 二零零三年六月
Recorded the first revenue dollar
錄得第一元收入

September 2003 二零零三年九月
Relocated ASTRI's base to Hong Kong Science Park for further development
將基地遷移至香港科學園作進一步發展

April 2004 二零零四年四月
Completed the first spin-off of photonic technologies to SAE Magnetics (HK) Ltd
完成首宗業務分拆，將光電子封裝技術售予香港新科實業有限公司

December 2009 二零零九年十二月
Number of granted patents reached 50
獲批專利達五十項

July 2008 二零零八年七月
Signing of the first three Industry Collaborative Projects
簽訂首三個業界合作項目

2008 二零零八年
A wholly-owned subsidiary, the ASTRI Science and Technology Research (Shenzhen) Co. Ltd., was established in Shenzhen
在深圳設立了全資附屬公司「應科院科技研究(深圳)有限公司」

Fiscal Year 2007/08 二零零七／零八財政年度
Annual industry contribution started to exceed HK$10 million
業界投入的資金突破一千萬港元

April 2006 二零零六年四月
Designated the Hong Kong Research and Development Centre for Information and Communications Technologies by the Innovation and Technology Commission
獲創新科技署委派承辦香港資訊及通訊技術研發中心

April 2006 二零零六年四月
Spin-off of WiFi technologies to Altai Technologies Ltd
分拆WiFi技術予奧泰爾科技有限公司

December 2005 二零零五年十二月
Spin-off of wireless technologies to Marvell Technology Group Ltd
分拆無線電技術予俊茂微電子

April 2005 二零零五年四月
Granted the first U.S. patent
獲批首個美國專利

Company Profile
公司概況

The Hong Kong Applied Science and Technology Research Institute (ASTRI) was founded by the Government of Hong Kong Special Administrative Region in 2000 with the mission to enhance Hong Kong's competitiveness in technology-based industries through applied research.

In April 2006, ASTRI was designated the Hong Kong Research and Development Centre for Information and Communications Technologies by the Innovation and Technology Commission with special goals to perform leading-edge R&D for technology transfer to industry, develop much needed technological human resources and act as a focal point bringing together industry and university R&D assets.

Since inception, ASTRI has been delivering world-class technologies and customer-focused R&D catering to the needs of industry. Its R&D efforts traverse four interrelated areas, namely Communications Technologies, Enterprise & Consumer Electronics, IC Design and Material & Packaging Technologies. In March 2009, the Board of Directors approved the establishment of a research team in Bio-Medical Electronics to meet the changing needs of international communities.

In past years, the Institute built teams of excellent researchers, produced a volume of intellectual properties (IP) and created real economic impact by transferring technologies to clients in Hong Kong, the Mainland and the region. Extending its service to the Mainland market, ASTRI in 2008 established in Shenzhen a wholly-owned subsidiary, the ASTRI Science and Technology Research (Shenzhen) Co. Ltd.

Looking ahead, ASTRI will strive to become one of the best and most influential R&D centres in the region, enabling Hong Kong and the Mainland to enhance value from competitive and continuous technological advances for years to come.

香港應用科技研究院(應科院)由香港特別行政區政府於二千年成立，其使命是要透過應用研究協助發展以科技為基礎的產業，藉此提升香港的競爭力。

二零零六年四月應科院獲創新科技署委託，承辦「香港資訊及通訊技術研發中心」，肩負進行高質素研發工作，把科技成果轉移給業界；培育優秀科技人才；及整合業界和學術界的研發資源等任務。

應科院銳意創造世界級頂尖科技，實踐以顧客為導向的應用研究，以配合業界的真正需要。其研究範疇橫跨四個相關領域，包括通訊技術、企業與消費電子、集成電路設計及材料與構裝技術。董事局於二零零九年三月通過成立生物醫學電子組，以配合環球市場需要。

多年來應科院培養了不少卓越的研究人員，註冊了多項知識產權，並透過將這些嶄新科技轉移給香港、中國內地及區內業界，創造經濟效益。為進一步服務內地市場，應科院於二零零八年，在深圳設立了全資附屬公司「應科院科技研究（深圳）有限公司」。

展望將來，應科院將致力發展成為區內最優秀和最具影響力的研發中心之一，為促進香港及全中國持續的科技發展和提升競爭力而作出貢獻。

ASTRI R&D Centres at Hong Kong Science Park
位於香港科學園的應科院科研中心

1&5/F, Photonics Centre,
光電子中心1樓及5樓

Rm 109, 112-115, 1/F & 3/F
Bio-Informatics Centre
生物資訊中心1樓109、112至115室及3樓

Rm 310-318, 3/F, Lakeside 2
浚湖樓3樓310至318室

Chairman's Foreword
主席序言

All these are accomplished with the determination to strengthen the competitiveness of Hong Kong's technology-based industry.
為著加強香港以科技為本的工業的競爭力，我們憑著堅定信念，精益求精，屢創佳績。

Dr. Patrick Wang Shui-chung, JP, Chairman of the Board
董事局主席 汪穗中博士

As Chairman of the Board, I am privileged to present this Annual Report which illustrates the progress and achievements of ASTRI during the period 1 April, 2009 to 31 March, 2010.

First of all, I would like to extend my most sincere gratitude to all ASTRI staff for their devotion to work and commitment in bringing the institute to new heights during the past year. I also take this opportunity to record the Board's profound appreciation to Mr. Eddy Chan Yuk-tak, the former Commissioner for Innovation and Technology, and Mr. Roger Luk Koon-hoo for their invaluable contribution while serving as Directors of ASTRI. I have no doubt that they will continue to render their support and advice to ASTRI in the months ahead.

Founded in 2000 and now in its 10th year of operation, ASTRI is still a young institution compared with counterparts in the region, such as Taiwan's Industrial Technology Research Institute and Korea's Electronics and Telecommunications Research Institute which were established in 1973 and 1985 respectively. However, as we mature and develop, we are setting milestones in Hong Kong's technological developments. Many of our innovations have been awarded patents; we are collaborating with an increasing number of industrial partners; and we are nurturing a large pool of R&D talents. All these are accomplished with the determination to strengthen the competitiveness of Hong Kong's technology-based industry. We are indeed starting to harvest fruit from our strong and dedicated commitment in championing applied R&D.

I firmly believe that contributions to the community by a publicly funded organization such as ASTRI should be best evaluated by looking beyond investment returns. During the financial year, many ASTRI innovations, such as LED street lamps, e-learning platform and

本人謹以董事局主席身份呈交本年度年報，闡述應科院自二零零九年四月一日至二零一零年三月三十一日期間的發展與業績。

首先，讓我向過去一年全情投入工作，竭力使應科院更上一層樓的全體員工，致以最誠摯的感謝。我也希望借此機會代表董事局衷心感謝前任創新科技署署長陳育德先生及陸觀豪先生，他們出任本院董事期間對應科院貢獻良多，深信兩位今後仍會時賜南針，繼續支持本院。

應科院在二零零零年成立，至今已有十載，但相對於地區內同儕，仍屬年輕—台灣工業技術研究院及韓國的電子及通訊研究院分別在一九七三年及一九八五年創辦。然而，我們在成長和發展的進程中，也為香港的科技進步奠下了里程碑—我們許多創新發明獲得了專利權，業界合作夥伴數目與日俱增，大量科研人才在本院培育下發揮所長。為著加強香港以科技為本的工業的競爭力，我們憑著堅定信念，精益求精，屢創佳績；應科院經過多年奮力不懈推動應用研發，現在已開始獲取成果。

我堅信一所由公帑資助的機構，如應科院，要評價其對社會的貢獻實應放眼於投資回報以外。本財政年度內，應科院的許多創新技術，例如LED路燈、電子學習平台和準4G無線通訊等，均引起了社會人士，特別是業界朋友的關注，這些技術隨後由合作夥伴加以商品化，對社會產生重要影響。應科院在完

pre-4G mobile communication, have attracted the attention of the community at large and industrialists in particular. Their subsequent commercialization by our partners are making a substantial impact on our society. By performing relevant and high quality R&D for transfer to industry, ASTRI has been fulfilling its mission. We will not rest on our laurels nonetheless.

It is alarming to note that as Hong Kong slowly evolves into a knowledge-based economy, we are seriously lagging behind in R&D investment. In 2007, total R&D expenditure as a GDP percentage was 3.33 for Japan, 2.98 for Korea, and 2.20 for both Taiwan and Singapore, whereas Hong Kong's ratio was a mere 0.77 per cent.

Obviously, Hong Kong has to boost investment in R&D to strengthen its long-term competitiveness in the highly competitive hi-tech arena and to meet challenges that may arise in the future.

While it is encouraging to note the total R&D expenditure of local enterprises has steadily increased from less than 30 per cent in 2001 to nearly 50 per cent in 2007, it is imperative that the Government must continue to step up investment in innovation and technology to inculcate a culture of R&D in Hong Kong. In his Policy Address delivered last October, the Chief Executive shared the views of the Task Force on Economic Challenges, of which I am a member, in identifying innovation and technology as one of the six industries that Hong Kong has a cutting edge. It was further announced that an R&D Cash Rebate Scheme would be launched with a funding commitment of $200 million to encourage companies to establish long-term partnership with local research institutions. I applaud this decision because the scheme surely will induce further entrepreneurial commitment to R&D.

The Government can and should do more. For example, government departments should emulate practices from other countries regarding procurement policies on technical products and services for local suppliers when bidding prices and quality of products and services are comparable to well-established overseas competitors. Furthermore, as the Mainland adopts its 12th Five-Year Plan (2011-2015) promising increased investment in technology and innovation, the SAR Government could grasp the opportunity by formulating policies to leverage arrangements such as CEPA and the Shenzhen-Hong Kong Innovation Circle to help local owners of intellectual properties and manufacturers in technology-based industries explore and develop markets.

成高質素的研發並轉移予業界後，已確切地履行了它的使命。雖然如此，我重申本院同人將繼續同心協力，絕不會自滿自傲。

當香港慢慢演變成為知識型經濟體系時，我們也察覺本港在研發投資上嚴重滯後。二零零七年，日本的研發支出佔國內生產總值百分之三點三三，韓國為百分之二點九八，台灣和新加坡均為百分之二點二零，而香港則僅為百分之零點七七。

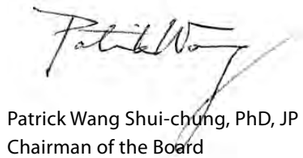
毫無疑問，香港必須增加在研發方面的投資，以在競爭極為劇烈的高科技範疇加強長線競爭力，應付未來的挑戰。

雖然本地企業總研發支出已由二零零一年的少於百分之三十，穩步增加至二零零七年近百分之五十，但是香港政府必須繼續加強在創新和科技的投放，這對於香港建構研發文化，至為重要。去年十月，行政長官發表了施政報告，採納了本人出任委員的經濟機遇委員會的意見，把創新科技納入為香港六項優勢產業之一。及後，政府撥款二億元，推出「投資研發現金回贈計劃」，鼓勵企業與本地研發機構建立長久合作關係。我對這個決定大力支持，因為此計劃肯定能誘使企業進一步投入研發。

政府還可而且應該做得更多，例如：當本地供應商的投標價及產品或服務品質與外國競爭者相若時，政府部門應參考其他國家所採用的技術產品及服務採購政策。此外，中國第十二個五年計劃（二零一一至二零一五年）應許在科技與創新方面增加投資，特區政府可抓緊機遇，制定政策，利用內地與香港更緊密經貿關係及深港創新圈等安排，協助香港知識產權擁有者和以科技為本的廠家，開拓和發展市場。

In my view, the Government must be proactive and forthcoming in adopting appropriate policies, such as the R&D Cash Rebate Scheme, that create a favourable environment encouraging local technology-based enterprises to embed R&D investment in their long-term strategic plans. In actualizing research potential of the private sector, ASTRI, with continuous support of the Government, undoubtedly will have a significant role to play, and with its R&D capability, will be able to help our industries succeed in the long run.

I pledge that ASTRI's primary task is serving Hong Kong and its people. By always bearing at heart the overall interest of industry and the community, we will continue to do our utmost to generate the greatest benefit for the community at large.



Patrick Wang Shui-chung, PhD, JP
Chairman of the Board

我認為政府在鼓勵以科技為本的廠家把研發活動納入其長線策略性計劃內時，須積極主動制訂如「投資研發現金回贈計劃」及其他適當政策，創造有利環境，助產業界開發潛藏的研發力量。在這方面，應科院在政府的持續支持下肯定能擔負重要角色，以其日益茁壯的研發能力協助業界進一步推動業務，取得長線成功。

應科院的基本責任是為香港社會和市民服務，我們會把業界和社會整體利益放在首位，並將繼續一往直前，克盡己任，為社會大眾的最大福祉而努力。

董事局主席
汪穗中

CEO's Review
行政總裁回顧

In our continuing campaign to commercialize our technologies and innovations, I am proud to point out that after a decade of devoted efforts, some of our technologies have been adopted by reputable manufacturers in their products being sold worldwide.
應科院在過去十年銳意將創新科技商業化的努力已漸見成果。部分我們研發的技術更獲著名廠商使用在他們的產品上行銷各地，令我們深感自豪。

Dr. Cheung Nim-kwan, Chief Executive Officer
行政總裁 張念坤博士

I am most pleased to report the year under review was highly successful and rewarding with ASTRI continuing to expand and develop its core activities.

During the year, ASTRI either achieved or exceeded most of its key performance targets. There were records set on various fronts including the number of ITF-funded (Innovation and Technology Fund) platform, seed and collaborative projects, contract research projects, licence agreements and amount of income from industry. Details of our performances are elaborated in the following chapters of this report.

As Hong Kong's industry started to recover from the global economic turmoil, its collaboration with ASTRI consequently accelerated steadily. As a result, ASTRI increased the number of technology transfers from 89 to 100, a 12 per cent rise. Income from industry was also up from $39.4 million to $47.2 million, representing a substantial 20 per cent increase. This is concrete proof our customers are showing increasing confidence and interest in ASTRI's wide range of customer focused R&D.

In our continuing campaign to commercialize our technologies and innovations, I am proud to point out that after a decade of devoted efforts, some of our technologies have been adopted by reputable manufacturers in their products being sold worldwide.

本人欣然匯報，應科院在二零零九至一零財政年度內繼續擴充和發展各主要核心活動，並取得驕人成績。

年內，應科院完成或超越了大部份重要業務指標，其中包括所承辦由創新及科技基金資助的平台研究項目、種子研究項目及業界合作項目的數量；與業界簽訂的研究項目合約及授權協議的數目；及從業界所得的收入，均創新猷。業績詳載於本年報之內。

隨著本港工業界從環球經濟震盪的陰霾中漸漸復甦，業界與應科院的合作也轉趨活躍。由本院轉移給業界的技術數量由八十九項增加至一百項，增幅是百分之十二。從業界所得收入增幅更高達百分之二十，由三千九百四十萬元增加至四千七百二十萬元。這足以證明客戶對我們所研發以顧客為導向的技術的支持及信心，均與日俱增。

應科院在過去十年銳意將創新科技商業化的努力已漸見成果。部分我們研發的技術更獲著名廠商使用在他們的產品上行銷各地，令我們深感自豪。

In the same year, ASTRI actively provided training opportunities for local university graduates. Supported by the Government's Internship Programme, ASTRI last year recruited 47 science and engineering students as R&D project interns. Those with outstanding performances were offered engineer positions before the end of their one-year internship. Feedback from interns and their mentors was most favourable. To further boost ASTRI's pool of research talents whom we believe will play a key role in leading Hong Kong towards its goal of becoming a technology hub in the region, we decided to recruit and nurture another 60 interns in the coming year.

Successful commercialization include LED lights and LED street lamps, with the latter being installed in several major cities on the Mainland; Hong Kong's first e-learning device; advanced and affordable Magnetic Resonance Imaging; TD-LTE dongle which enables pre-4G wireless communication; and multi-standard HD video decoder SoC for high definition TV set-top box. We firmly believe commercializing these home-grown technologies will not only benefit industry and create social and economic impacts, but in the long-term enhance the quality of life of people all over the world.

While counting our success on various fronts, we are fully aware the foundation of our admirable performances is built on the commitment, professionalism and, above all, the absolute dedication of our staff to offer service par excellence. ASTRI, therefore, attaches great importance to its people. Besides recruiting the best minds in Hong Kong and overseas, we are nurturing local talents. In this fiscal year, our R&D workforce was boosted by 21 per cent. Currently, 86 per cent of total employees are involved in R&D. Regarding staff turnover, we managed to reduce it from 14 per cent in 2008/09 to 10 per cent this year.

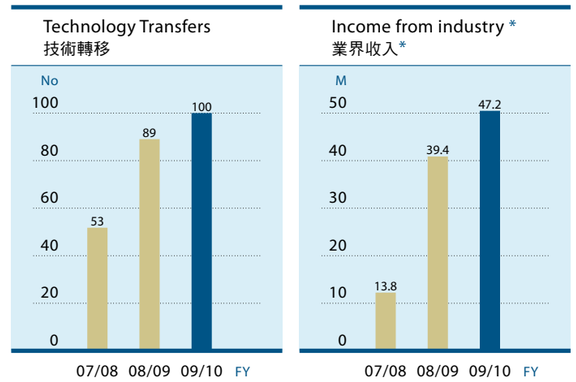
同年，應科院積極為本地大學畢業生提供培訓機會。在政府推行的實習研究員計劃支持下，本院去年招聘了四十七名理科及工程系學生成為實習研究員。當中表現優異的，更在一年實習期屆滿後獲聘用為工程師。此計劃亦深受實習員和他們的導師歡迎。為進一步建立香港的研究人才庫，我們計劃在來年招聘另外六十名實習員。我們深信應科院培訓的人才將來必定能擔當帶領香港邁向成為區內科技中心目標的重責。

已成功商品化的技術有LED照明及LED路燈，後者已在國內幾個主要城市安裝及使用；全港首部電子書；先進和成本低廉的磁共振掃描技術；為開通準第四代流動通訊技術而設的TD-LTE數據卡；及採用了應科院多標準高清視頻解碼晶片的高清電視機頂盒等。我們堅信，透過將這些本土技術商業化，不僅有利於產業和為社會及經濟創造效益，長遠更有助提升全球人類的生活質素。

在回顧我們在各方面的成就時，我們也充分意識到我們的成功是建基於一群熱心工作和專業的同工不懈的努力，最重要的是他們都擁有一份矢志追求卓越的精神。應科院因此一直十分重視人才。本院除了在世界各地羅致最優秀的人才外，也著重培訓本地新血。本院的研究員數目於去年增加了百分之二十一；在員工總數中佔百分之八十六。員工的流失率則保持在較低水平，由去年的百分之十四下降至本年度的百份之十。

Percentage increase of technology transfers to industry
轉移給業界的技術數量增幅為
+12%

Percentage increase of income from industry
從業界所得收入增幅為
+20%



No number 數目 M million (HK$) 百萬(港元) FY fiscal year 財政年度
* received cash and in-kind 實收現金和物資資助

Accommodating the growth in our staff establishment, we leased additional office and lab space in Hong Kong Science Park.

Since launching the Industry Collaborative Project (ICP) scheme in 2007/08, the number of ICP projects has reached eight with the total committed income at $37 million as at 31 March, 2010. These projects will no doubt further leverage the strengths and resources of ASTRI and its partners to develop new technologies to meet market needs.

In terms of research direction, we are determined to further strengthen our competency in the four established areas, namely Communications Technologies, Enterprise & Consumer Electronics, IC Design and Material & Packaging Technologies.

As we are becoming more and more health and environmentally conscious, ASTRI is setting its sights on projects connected with healthcare and green technologies. With the establishment of the Bio-Medical Electronics team in 2009, we have already started a couple of medical and health care related projects with noticeable progress. We anticipate projects such as LED lights, LED street lamps and the micro-inverter to evolve in-line with green concepts, and ultimately contribute to the well-being of mankind by affording them a healthier and greener lifestyle.

At the time of reporting, ASTRI was already well into its 10th year. It is, therefore, most opportune for us to review our past performance and plan our way forward. While the record shows ASTRI in the past decade has on the whole lived up to the community's expectation, there is no room for complacency.

Dr. Cheung (sixth from right) is awarded Distinguished Alumni for Faculty of Science 70th Anniversary by the Hong Kong University
張博士(右六)獲香港大學頒授理學院七十周年傑出校友獎

為了配合員工數目的增長，我們已在香港科學園租用了額外的地方，作辦公室及實驗室用途。

同時，本院於二零零七／零八年首度推出的業界合作項目計劃也有長足的進展。截至二零一零年三月三十一日，共有八項合作計劃在進行中，已簽訂的收入共三千七百萬元。毫無疑問，此類計劃可以讓應科院和合作夥伴充分結合和調配資源，發揮彼此所長，來發展新科技，以應市場需要。

研究方向方面，我們決心進一步發展我們四個核心技術領域，即通訊技術、企業與消費電子、集成電路設計和材料與構裝技術。

隨著人們對健康和環保的意識不斷增強，應科院也開始著眼發展保健和綠色科技項目。自生物醫學電子組於二零零九年成立後，本院已開辦了數項與醫學和保健相關的項目，並取得良好的進展。我們期望透過帶有環保概念的項目，如LED照明、LED街燈及微型逆轉器等，造福人類，為他們帶來更健康和更綠色的生活模式。

在發表此年報之際，應科院已踏入十周年，也正好是我們回顧過去，計劃未來的良機。雖然本院的業績顯示我們在過去十年的整體表現已符合廣大公眾的期望，但我們絕不會因此而自滿。

我們清楚知道來年將面對更大的挑戰，那就是要透過將科技轉移給業界作商業化，實踐「從意念走向市場」這個重要過程。因此，應科院將進一步加強其市場營銷能力，並制訂一個框架，確保我們能夠迅速並及時地將應用技術商業化。

董事局和管理層續致力監察應科院的運作，以確保其合乎成本效益。本人很高興向大家報告，本院已再次成功將行政人力開支維持在相對較低的水平。在二零零九至一零年度管理及行政人力成本三千九百九十萬，僅佔總人力成本二億三千七百四十萬元的百份之十六點八。

We know full well the biggest challenge in the coming year will focus on how we proceed with our "from minds to markets" process involving transfer of our technologies to our partners and commercializing them. ASTRI, therefore, will further strengthen its marketing capability and formulate a framework ensuring our applied technologies will be commercialized in a speedy and timely manner.

Meanwhile, the management, guided by its Board, also closely monitored operations to ensure cost-effectiveness. I am pleased to report ASTRI was again able to keep its administrative manpower expenditure at a relatively low level. For this fiscal year, the ratio of management and administrative manpower expenditure ($39.9 million) was only 16.8 per cent of the total manpower spending ($237.4 million).

Expenditure on administrative staffing compared favourably with other higher education and research institutions in the region. Anticipating budget cut in the coming year, the management, apart from continuing to closely monitor spending, also employed appropriate measures to achieve further savings and greater value for money in its operation.

The task ahead is no doubt challenging. However, with support from Government, particularly the Innovation and Technology Commission, the industry and total commitment of everyone at ASTRI, I am confident we will rise to the occasion and live up to the expectation of stakeholders to become a source of pride for Hong Kong.

Cheung Nim-kwan, PhD
Chief Executive Officer


01


02

01 Dr. Cheung meeting with Prof. Liu Yingli (right), Chairman of the Shenzhen side of the Steering Group on Shenzhen/Hong Kong Co-operation in Innovation and Technology
張博士與深港創新及科技合作督導會議深方主席劉應力教授(右)會面

02 Dr. Cheung (second from left) receives the Donald W. McLellan Meritorious Service Award from IEEE Communications Society
張博士(左二)獲國際電機電子工程師學會屬下通訊學會頒授「通訊學會唐納德馬克蘭傑出服務獎」

本院行政員工薪酬開支與區內其他高等學府及研究機構的情況相若。由於預計來年經常性撥款會被削減，管理層除了要繼續密切監控開支，還會採取適當措施節省運作成本，增加經濟效益。

應科院未來無疑將要肩負重任，面對重大挑戰。然而在政府特別是創新科技署、業界的支持下和本院各位員工的共同努力，本人堅信應科院必定能昂首向前邁進，衝破障礙，毋負眾望，竭力為香港服務，為港人爭光。

行政總裁
張念坤

Operation and Performance
營運與業績

With one **mind**, we strive for excellence
目標一致，追求卓越

Operation
營運

Management for Quality 優質管理

As a publicly-funded applied research institution, ASTRI operates under the firm conviction it exists for the maximization of "public good", which is measured by the economic impact and other benefits it brings to industry and the community. To generate and sustain the economic impact, ASTRI vigorously focuses on customers and technology transfers.

ASTRI builds its operations under the theme "customer-focused R&D", which aims at maximizing R&D impact on customers and makes converting research into real results a systematic process by which customer focus is built into every aspect and every step of ASTRI's R&D programmes, from initiation to transfer of the generated intellectual properties (IPs) to customers.

In addition to developing world class IPs and transferring them to customers, ASTRI puts much emphasis on assuring the quality of both its researches and management processes.

R&D Quality Assurance

To assure the quality of its R&D programmes, ASTRI conducts its Annual Planning Cycle comprising the following steps.

作為一家政府資助的應用研發機構，應科院堅守一個經營信念，就是以產生最大的「公眾利益」為目標，而此公眾利益是以應科院帶給業界和整體社會的經濟效益和其他得益來衡量。為了創造及維持經濟效益，應科院全力以赴，以顧客和技術轉移作為重點。

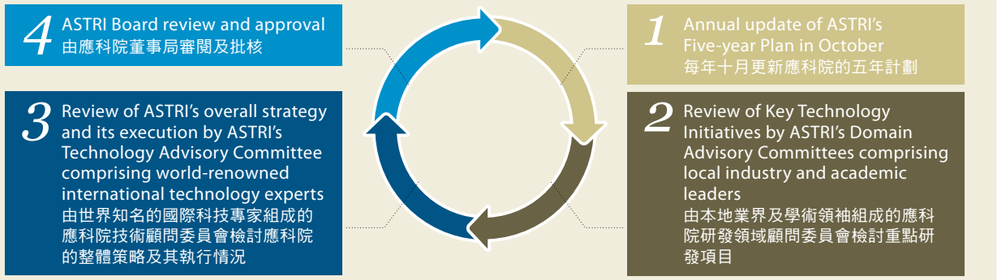
應科院的經營模式建立在「顧客導向研發」的主軸上，確保研發活動產生最大顧客效益，並使研究轉化為具體成果的過程系統化；這套系統化過程把顧客導向納入應科院各研發項目的每一環節每一步驟—由研究計劃的開始直至將所研發的知識產權移轉至客戶。

除了不斷努力研發世界級知識產權及將其有效地轉移給業界外，應科院對於確保其研究和管理過程的質素，也非常重視。

研發質素保證

為確保其研發項目的質素，應科院以年度週期作出規劃，當中包括以下步驟。

Annual Planning Cycle for conducting R&D programmes
規劃研發項目的年度週期



This process is also adopted for vetting and monitoring all ongoing R&D projects, which are reviewed by the Board between six to nine months from project commencement to evaluate the effectiveness of customer engagement. Half-yearly progress reports will be submitted to the Innovation and Technology Commission to examine project progress against its stated milestones. The projects are also subject to quarterly reviews by the Board's Technology Committee and each ongoing project is monitored monthly for progress by ASTRI's Chief Technology Officer.

此四步程序也用於查核和持續監控所有正進行的研發項目。這些項目均由應科院董事局於項目開始後六至九個月內審核，以評估其獲取顧客支持的成效。每半年向創新科技署提交的進度報告也便於查考項目的進展以及達標程度。董事局的技術委員會並會於每季審核各項目，而應科院首席科技總監會監察各項目每月的進度。

Corporate Governance

ASTRI is headed by a Chief Executive Officer and is governed by a Board of Directors which is responsible for ASTRI's policy and strategic directions. Directors are appointed from the industrial and commercial sectors, the academia and the HKSAR Government to assist the Board in fulfilling its role of managing ASTRI.

Three functional committees, namely Finance and Administration Committee (FAC), Technology Committee (TC) and Audit Committee (AC), assist the Board in managing ASTRI. FAC oversees ASTRI's finance and administration matters; TC oversees research initiatives; and AC ensures both internal and external audit processes are properly carried out.

To assure management quality, ASTRI compiled a Board-approved Corporate Governance Manual. The operational procedures are clearly spelt out in the business procedure manuals which are compliant to ISO 9001:2008 standards. These processes are expected to undergo further audit by the ISO agency in 2010/11. On the whole, the four key objectives of ASTRI's management system are Transparency, Speed, User-friendliness and Governance.

During the past years, sections of the Corporate Governance Manual were updated and modified, taking into account changes and developments required for improving ASTRI's operation, and to respond flexibly to and reflect on the changing terms and conditions of the business environment in which ASTRI operates.

To further strengthen governance and enhance ASTRI's efficiency, management in January 2009 consulted various ASTRI groups collecting views on updating the manual. After considering comments from colleagues, management completed the first revised draft in mid-August 2009 and forwarded it to Innovation and Technology Commission (ITC). Feedback from ITC was incorporated into the manual with management's consent.

Reiterating the total commitment of both the Board and management in upholding the highest level of integrity in ASTRI business practices and staff ethical standard, a special section in the revised version was dedicated to "Code of Ethical and Professional Conduct".

企業管治

應科院以行政總裁為首，並由董事局管治；董事局負責製訂應科院的政策和策略方向，成員來自工商界、學術界及香港特區政府，由委任產生，協助董事局管理應科院。

董事局設有三個功能委員會，分別為財務與行政委員會、技術委員會及審計委員會，以協助董事局管理應科院各項事務。財務與行政委員會監督應科院財務及行政事宜，科技委員會監督應科院的研究項目，審計委員會則確保內部及外部審計程序被適當地執行。

為確保管理質素，應科院已制定經董事局批准的企業管治手冊，並且已成為符合ISO 9001:2008管理程序標準的科研機構，這些程序計劃在二零一零/一一年度續予稽核。應科院以ISO為基礎的管理系統的四大指標為透明度、速率、簡易程度和管治。

過去數年間，企業管治手冊中多個段落已告更新和改動，把對改善應科院運作模式所必要的轉變和發展納入考慮範圍，及以業界的需要為重點，對應科院所處的營運環境的轉變作靈活的應對和考量。

為進一步加強管治以及促進應科院的營運效率，管理層於二零零九年一月與應科院內多個群組舉行諮詢會，廣集意見。在適當地考慮了同事經由諮詢過程提出的意見以及建議後，管理層於二零零九年八月中完成了第一份修訂稿，然後呈交創新科技署。創新科技署的回饋經管理層細閱並同意後，併入修訂稿內。

董事局及管理層要求應科院的商業操作廉正不阿，員工保持最高的道德操守，為重申這不二承諾，修訂版中特闢一欄「道德及專業行為守則」。

The manual also clearly defined policies and guidelines regarding "Financial Management of ASTRI's Recurrent Subvention" and "Procurement of Goods and Services". The guidelines spelt out the latest revisions on delegating authorities to senior management regarding financial matters such as approving expenditures and purchase orders, signing cheques, and writing off bad debts, inventory and other valuables, etc.

In addition, new sections on "IP Portfolio Management" and "Technology Transfer" were included in the manual providing the latest policies and guidelines in these two important areas. The section on "R&D Project Management and Process" was also updated.

The revised manual was tabled and reviewed by the Audit Committee and the Finance and Administration Committee at their respective meetings on 11 and 17 September. The final version was subsequently approved by the Board at its September meeting.

Furthermore, to efficiently exercise good corporate governance, an Internal Audit Department under the Audit Committee was set up in 2007 to assist the Board by providing it information and assurance on internal management controls.

Under the manual, the Internal Audit Department is required to carry out annual audits to meet coverage requirements specified by the Board in accordance with determined priorities. The department is also required to review efficiency and effectiveness of the internal control system and report to the Board via the Audit Committee. With respect to these requirements, semi-annual Internal Audit Progress Reports were presented to the Audit Committee.

In April 2007, the Board appointed the Head of Internal Audit as the Compliance Officer to assist its governance by providing timely information to the Audit Committee on the compliance status of ASTRI regarding policy and procedures of project management, finance, human resources and administrative management.

To ensure continuous compliance with the Guide to Information and Technology Support Programme (ITSP), ASTRI's corporate governance policy, operational procedures and other relevant guidelines, the Compliance Officer is required to submit quarterly reports to the Audit Committee.

有關「應科院經常性撥款的財務管理」及「貨品與服務購置」的政策和指引亦清楚寫明；此兩段下各欄目闡述了在諸如批核支出和訂購、簽發支票，及報廢呆帳、存貨及其他貴重物品等財政事務上，授權予高層管理人員的最新修訂。

此外，修訂的手冊也加入了新欄目「知識產權組合管理」和「技術轉移」，提供此兩個重要範疇的最新政策和指引。「研發項目管理及流程」一欄也有所更新。

修訂的手冊已於九月十一及十七日分別於審計委員會和財務與行政委員會會議上呈遞，並獲檢核。最終修訂版本隨後於九月的董事局會議上獲得認可。

此外，為有效進行良好的企業管治，應科院於二零零七年成立內部審計部門，隸屬於審計委員會，協助董事局，向其提供有關內部管理控制的資訊及保證。

內部審計部門每年應根據確定的優先次序進行審計，以達到董事局對審計範圍的要求。內部審計部門並負責審核內部控制制度的效率和有效性，透過審計委員會向董事局報告。為此，內部審計部門每半年向審計委員會提交內部審計進度報告。

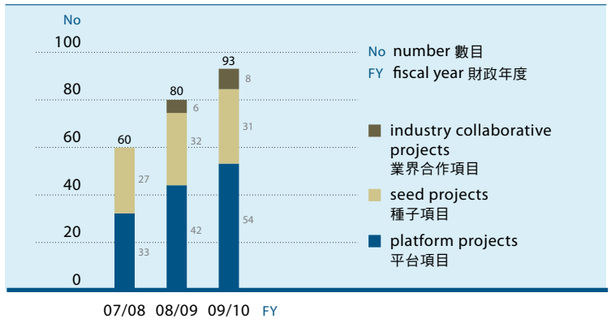
二零零七年四月，董事局委任內部審計主管擔任合規主任，協助進行企業管治，適時向審計委員會提供有關應科院遵守項目管理、財務、人力資源及行政管理政策和程序的情況。

為確保應科院持續遵守《資訊及科技支援計劃指引》、企業管治手冊、ISO程序及其他相關指引，合規主任必須每季度向審計委員會提交報告。

Performance
業績

During the year under review, ASTRI undertook 93 R&D projects funded by the Innovation and Technology Fund (ITF) and 69 contract research projects. The following table shows the number of ITF-funded projects undertaken in the past three years.

Total number of ITF-funded projects undertaken by ASTRI
應科院承辦由創新及科技基金資助的研發項目總數



Quantitative performance targets were rigorously set at the beginning of the financial year and monitored continuously to ensure all customer-focused considerations described above have been addressed effectively. The targets are used as essential basis for appraising the performance of R&D groups and their leaders. The three main types of quantitative performance targets adopted are:

(a) Number of technologies transferred to industry per year - this is most crucial as they are the "path" towards commercializing IPs developed by R&D projects;
(b) Number of patents filed per year as well as number of patents granted and its success ratio - this is important because patents are the essential indicators of the worthiness of innovations and they are used to increase the value of technology transfer activities; and
(c) Income from industry per year - as ASTRI continues to engage customers and build a valuable brand name to its customer base, eventually the incomes from this customer base through various services such as the licensing and sales of technologies, design services, product development services will start to increase.

During the year under review, ASTRI achieved impressive progress in all its major performance indicators.

年度內應科院進行九十三項由創新及科技基金資助的研發項目，和六十九項合約研究項目。左表展示過去三年應科院進行由創新及科技基金資助的研發項目的數量。

每個財政年度初，應科院均會嚴格地設立可量化的業績目標，並持續監察，以確保有效地處理上述顧客導向的各種考慮因素。這些目標會用作對應科院的研發團隊及其負責人進行年度工作評審的主要基準。應科院採納的三大可量化工作目標如下：

(a) 每年轉移至業界的技術數目：由於這是研發項目所開發的知識產權轉至商業化發展的「門徑」，所以至為重要；
(b) 每年申請和取得的專利數目及其成功率：專利是評估所研發的技術是否有價值的主要指針，並可增加技術轉移活動的價值，因此十分重要；及
(c) 每年從業界所得的收入：隨著應科院繼續爭取顧客並在顧客心目中建立有價值的品牌，透過各種服務，如授權協議、技術轉售、定制設計、產品開發等，自顧客取得的最終收入將會增加。

年度內，應科院在各個工作目標均取得令人矚目的進展。

Technology Transfers 技術轉移

The number of technology transfers to industry continued to grow. Starting with only two in 2003/04, ASTRI completed a total of 100 transfers during the year. The breakdown of technology transfers by R&D Groups for the past three years is tabulated below.

應科院向業界轉移的技術數量繼續增長，由二零零三／零四年只有兩項增至本年度共一百項。各研發群組過去三年向業界轉移的技術數量表列如下。

Number of technology transfers
技術轉移數目

R&D Group	研發群組	2007/08	2008/09	2009/10
Communications Technologies	通訊技術	14	42	34
Enterprise & Consumer Electronics	企業與消費電子	19	15	19
IC Design	集成電路設計	7	12.5	7
Material & Packaging Technologies	材料與構裝技術	13	19.5	40
Bio-Medical Electronics (team)	生物醫學電子(組)	N.A./不適用	N.A./不適用	0
Total	總數	53	89	100

The following table illustrates the number of technology transfers to industry by various channels during the past three years.

下表比較過去三年通過各種途徑向業界轉移技術的數目。

Number of technology transfers to industry by various channels
通過各種途徑向業界轉移技術的數目

Technology transfers to industry in the form of	向業界轉移技術的方式	2007/08	2008/09	2009/10
ITF-funded industry collaborative project agreements signed	簽訂由創新及科技基金資助的「業界合作項目」	0	8	1
Contract research project agreements signed	簽訂合約研究項目	33	57	69
Licensing agreements signed	簽訂授權協議	20	24	30
Total	總數	53	89	100

During the year, ASTRI completed a total of
本年度，應科院共完成

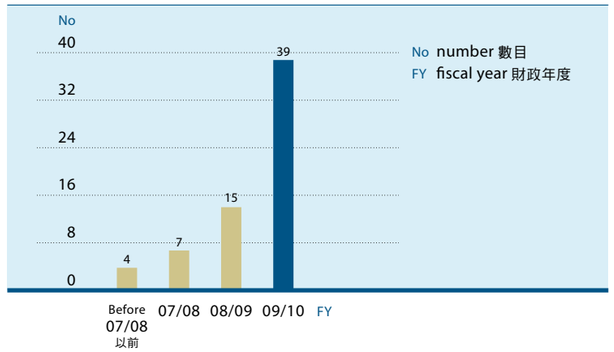
100

technology transfers
項技術轉移

Patents 專利

As at 31 March, 2010, 65 patents were granted to ASTRI. The following table shows the number of patents granted in past financial years.

Number of patents granted on the Mainland, U.S. and other countries
於中國內地、美國及其他國家所取得的專利數目



Until March 2010,
直至二零一零年三月，
應科院共獲批

65

patents were granted to ASTRI
項專利

截至二零一零年三月三十一日，應科院共取得六十五項專利。左表展示過去財政年度獲批的專利數目。

A total of 119 patents were filed on the Mainland, U.S. and other countries in 2009/10. From 2007/08 to 2009/10, ASTRI filed more than 350 patents for new inventions (96 in 2007/08, 139 in 2008/09 and 119 in 2009/10). The following table shows the breakdown by R&D Groups.

在二零零九／一零年，應科院在中國內地、美國及其他國家，共作出一百一十九項專利申請。從二零零七／零八年至二零零九／一零年間，應科院已為新發明申請超過三百五十項專利(二零零七／零八年九十六項，二零零八／零九年一百三十九項，及二零零九／一零年一百一十九項)。下表列出各研發群組申請的專利數目。

Number of patents filed on the Mainland, U.S. and other countries by R&D Groups
各研發群組於中國內地、美國及其他國家所申請的專利數目

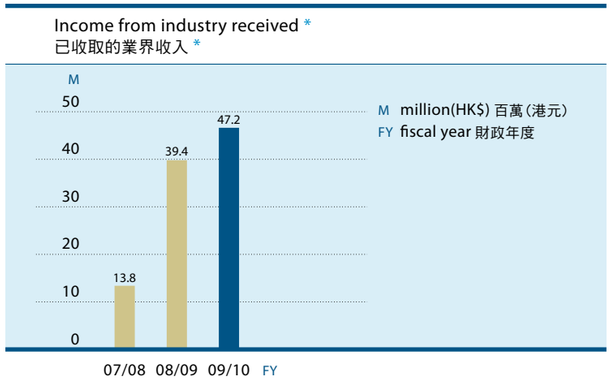
R&D Group	研發群組	2007/08	2008/09	2009/10
Communications Technologies	通訊技術	11	29	14
Enterprise & Consumer Electronics	企業與消費電子	18	23	26
IC Design	集成電路設計	9	12	11
Material & Packaging Technologies	材料與構裝技術	58	75	64
Bio-Medical Electronics (team)	生物醫學電子(組)	N.A./不適用	N.A./不適用	4
Total	總數	96	139	119

Income From Industry 業界收入

During the year, income from industry received for all projects amounted to $47.2 million, equivalent to 17.3 per cent of the actual R&D project expenditure. The following table shows the increase in income from industry in the past three years.

是年度從所有項目已收取的業界收入總額為四千七百二十萬港元，佔總項目成本的百分之十七點三。左表顯示過去三年業界收入的增長。

Income from industry received *
已收取的業界收入 *



Income from industry received amounted to
已收取業界收入總額為

$47.2

million (HK$)
百萬(港元)

The table below compares income from industry received by the five R&D domains in the past three years.

下表把過去三個財政年度五個研發領域所獲得的業界收入作一比較。

Income from industry received *
已收取的業界收入 *

R&D Group	研發群組	2007/08 (HK$M 百萬港元)	2008/09 (HK$M 百萬港元)	2009/10 (HK$M 百萬港元)
Communications Technologies	通訊技術	6.7	15.7	13.9
Enterprise & Consumer Electronics	企業與消費電子	3.1	12.3	11.9
IC Design	集成電路設計	1.3	2.6	8.8
Material & Packaging Technologies	材料與構裝技術	2.7	8.6	10.2
Bio-Medical Electronics (team)	生物醫學電子(組)	N.A./不適用	N.A./不適用	2.4
Others	其他	N.A./不適用	0.2	N.A./不適用
Total income from industry received *	從業界取得的收入總額 *	13.8	39.4	47.2

* Including cash and in-kind contribution 包括現金及物資資助

Successful Cases of Commercialisation 應科院技術成功商品化

In 2009/10, 63 companies were engaged in 100 cases of technology transfer with ASTRI through technology licensing, contract service and other means, resulting in many successful commercialization cases, the following are some examples.

單在二零零九／一零年，應科院藉技術授權、合約服務及其他途徑作出了一百項技術轉移，涉及六十三間公司，成功商品化的個案繁多，以下是一些例子。

Technologies generated from a LED lighting project were licensed to a local company. Subsequently, two new products were launched globally. These products are more efficient than traditional incandescent lights and are in-line with the worldwide tendency for green industries.	LED照明項目所產生的技術授權予一間本地公司，其後，兩種新產品在環球市場面市，這些產品比傳統的白熾燈更有效率，也正好配合世界各地環保工業的趨勢。
ASTRI's LED lighting technologies were applied for road lighting, giving rise to product prototypes for market evaluation. The street lamps received third party certifications and fulfilled road lighting-related standards and criteria for Hong Kong and the Mainland.	應科院照明技術更進一步用於道路照明，成功創製出產品原型讓市場評估。該路燈已獲第三方認證及符合香港和內地道路照明的相關標準和條件。
A local manufacturer of cable television and communication products employed ASTRI's technologies to develop improved set-top boxes for commercialization. The product was welcomed by the market and chosen by readers of a popular local AV magazine as the winner of 2009 Best Set-top Box Award. Later, it was also named the "Best of HDTV Recorder" by another magazine.	一家本地電視及相關通訊器材製造商利用應科院技術開發出改良的機頂盒，並將之商品化。該產品受到市場歡迎，並獲一本熱賣的本地影音雜誌讀者選為二零零九年「機頂盒年度之選」。該產品其後又獲另一雜誌頒贈「最佳高清電視錄影機獎」。
A local company commissioned ASTRI to develop low-cost MRI machines. By making MRI technology more affordable, health care in developing countries can be enhanced.	一間本地公司委託應科院開發低成本的磁共振掃描機。低廉的磁共振掃描技術有助發展中國家改善醫療服務。
A local e-learning solution provider adopted ASTRI's technologies in developing the first mobile e-learning device which is being widely deployed at local schools.	一所開發電子學習解決方案的本地公司應用了應科院技術，發展出香港第一部流動電子學習器件，廣為學校採用。
RF jammers, one of the deliverables of another ASTRI project, were installed at the Lion Rock Tunnel eliminating the chance that drivers may be charged twice for road toll. The jammers confine the RF to the auto toll lanes and ensure that only drivers in those lanes have charges deducted.	射頻干擾器是應科院另一項目發明，已安裝於獅子山隧道，以保障司機避免雙重付款。干擾器用於自動繳費行車線，確保只會向在該些行車線上的司機扣除費用。
ASTRI researchers are working tirelessly with Mainland partners in arranging demonstration of pre-4G technology at the Shanghai World Expo.	應科院研究員努力不懈地與內地合作夥伴籌備在上海世博示範準第四代流動通訊技術。

Awards and Accolades 獎項與榮譽

During the year under review, ASTRI's innovative technologies received many prestigious awards, illustrating our R&D efforts are well recognized by industry and the community at large.

在本財政年度內，應科院的創新技術獲得多個獎項，顯示出應科院的研發工作大受業界和整體社會讚賞。

Technological Achievement Award, Hong Kong Awards for Industries	香港工商業獎科技成就獎
Silver Award, Best Lifestyle (Green & Healthy), Hong Kong ICT Awards	香港資訊及通訊科技獎最佳生活時尚獎銀獎（綠色．健康）
Certificate of Merit, Best Lifestyle (Creative & Free Living), Hong Kong ICT Awards	香港資訊及通訊科技獎最佳生活時尚獎優異證書（創意．休閒）
Certificate of Merit, Best Collaboration (Most Innovative Project), Hong Kong ICT Awards	香港資訊及通訊科技獎最佳協同合作獎優異證書（最具創意項目）
Certificate of Merit, Best Collaboration (Greater China Market), Hong Kong ICT Awards	香港資訊及通訊科技獎最佳協同合作獎優異證書（大中華市場）
Local Innovation Award, EDN China Innovation Awards *	EDN中國創新獎本地創新獎 *
Editor's Special Recommendation Award, EDN China Innovation Awards *	EDN中國創新獎編委特別推薦獎 *
Top 10 Innovative Achievements Award in Zhong Guan Cun, Beijing *	北京中關村十大企業技術創新成果 *
Best Set-Top Box Award, AV Magazine *	《 AV雜誌 》「 機頂盒年度之選 」 *
Best of HDTV Recorder, HDAV Award 2009, HDAV Magazine *	《 HDAV雜誌 》「 2009最佳高清電視錄影機獎 」 *
Award of Merit, Energy Saving Product Award of Environmental Protection & Friendly Business Award, Hong Kong	香港「 環保『友』道企業大賞 」節能產品獎優異獎
Best Paper Award, International Conference on Electronic Packaging Technology & High Density Packaging, China	中國電子構裝技術及高密度構裝國際會議最佳論文獎
Merck Award for Outstanding Scientific Contribution to the Display Technology, International Meeting on Information Display, Korea	韓國國際信息顯示會議傑出科學貢獻默克獎

* Award received by client with technology licensed from ASTRI 獎項由採用應科院授權技術的客戶獲得

Technology Development Roadmap 技術發展路線圖

ASTRI's R&D projects are formulated with a view to building and strengthening the institute's technical competence or platform technologies that continuously spawn a multitude of future applications. When these combinations are well-planned and executed, the competence and applications would feed off each other and achieve best results. The key technology initiatives (each may have multiple tracks) of the five technology domains are summarized below:

應科院銳意籌謀研發項目，以建構和不斷加強技術能力或平台技術，持續地引發大量未來的應用項目。這些組合若能周全計劃，妥善執行，研發能力和應用項目便能相輔相承，獲得最佳成果。五個技術領域的重點研發項目（每一項目或有多條進路）簡述於後：

Communications Technologies
- Multi-mode Multi-function System Technologies
- Low Power High Efficiency Radio Access Technologies
- Miniaturisation: Antenna and RFIC

Enterprise & Consumer Electronics
- Pervasive Services Technologies
- Mobile Multimedia Communications Technology
- Digital Home Technology
- Multimedia Technology IP

IC Design
- Power Management ICs and Technologies
- Analog, Mixed Signal, and RF ICs and Technologies
- High Speed Transceiver ICs and Technologies
- Digital ICs, ASICs and Technologies
- System on Chip Technologies
- IC Design Enabling Technologies
- High Performance Computing and Networking

Material & Packaging Technologies
- Display Systems
- Advanced Packaging Technologies
- LED Lighting
- Photonic Components
- Device Fabrications

Bio-Medical Electronics
- Brain Training Device
- Magnetic Resonance Imaging
- Thermal Therapy Device

Apart from the above, ASTRI initiated new Industry Collaborative Projects (ICPs) and green projects around ASTRI's green city initiative. During the year under review, there were eight ongoing ICPs at ASTRI and income from industry valued at HK$37 million was committed. Two additional ICPs are expected to be initiated in the IC Design Group soon.

通訊技術
- 多模多功能系統技術
- 低功耗高效能無線接入技術
- 小型化：天線及射頻集成電路

企業與消費電子
- 普及服務技術
- 移動多媒體通訊技術
- 數碼家庭技術
- 多媒體技術知識產權

集成電路設計
- 電源管理集成電路與技術
- 類比、混合訊號及射頻集成電路與技術
- 高速收發器集成電路與技術
- 數碼集成電路、專用集成電路與技術
- 系統整合晶片技術
- 集成電路設計授權技術
- 高性能計算與網絡連接

材料與構裝技術
- 顯示系統
- 先進構裝技術
- LED照明
- 光電子元件
- 器件研製

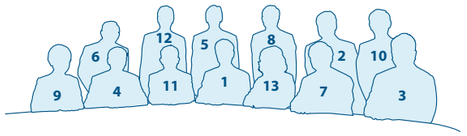
生物醫學電子
- 腦部訓練儀器
- 磁共振掃描
- 熱治療設備

此外，應科院已開展新的「 業界合作項目 」和圍繞應科院綠色城市研發領域的環保項目。在本財政年度內應科院有八個進行中的業界合作項目，合約價值總額三千七百萬港元。集成電路設計群組將增加兩項業界合作項目。

People
人才匯聚

Blooming of the best **minds**
人才匯聚，茁壯成長

Board of Directors
董事局



ASTRI is governed by a Board of Directors comprising representatives from the industrial and commercial sectors, the academia and the HKSAR Government. Directors are appointed by the Government and have collective responsibility for ASTRI's leadership, policy and strategic directions. As at 31 March, 2010, the Board comprised the Chairman and 16 members.

Chairman
Dr. Patrick Wang Shui-chung, JP [1]

Members (In alphabetical order of surnames)
Mr. Anthony Au Wai-hung, BBS [2]
Mr. Sunny Chai Ngai-chiu [3]
Prof. Philip Chan Ching-ho [4]
Prof. Chew Weng-cho [5]
Dr. Patrick Lam See-pong [6]
Mr. Henry Leung Kwong-han [7]
Mr. Humphrey Leung Kwong-wai [8]
Dr. Jacqueline Lui Chiu-tong [9]
Mr. Victor Ng Kwok-ho [10]
Prof. Vincent Y. Shen
Mr. Richard Sun Po-yuen [11]
Mr. Ben Wong Chung-mat, MH
Mr. Peter Wong King-fai
Mr. Luther Wong Lok-tak [12]

Official Members
Mr. Duncan W. Pescod, JP, Permanent Secretary for Commerce and Economic Development (Communications and Technology)
Miss Janet Wong Wing-chen, JP, Commissioner for Innovation and Technology [13]

應科院由董事局治理，董事局成員包括來自工商界、學界及香港特區政府的代表。董事都是由特區政府委任，他們負責集體領導應科院，制訂政策和戰略發展方向。直至二零一零年三月三十一日，董事局成員包括主席及十六位董事。

主席
汪穗中博士，JP [1]

董事（以英文姓氏次序排列）
區煒洪先生，BBS [2]
查毅超先生 [3]
陳正豪教授 [4]
周永祖教授 [5]
林師龐博士 [6]
梁廣恆先生 [7]
梁廣偉先生 [8]
呂許昭棠博士 [9]
吳國豪先生 [10]
沈運申教授
孫寶源先生 [11]
王忠秣先生，MH
黃景輝先生
王榮得先生 [12]

官守董事
柏志高先生，JP，商務及經濟發展局常任秘書長（通訊及科技）
王榮珍女士，JP，創新科技署署長 [13]

Members of Board Committees 董事局轄下委員會成員

Directors also served as members of the three functional committees, namely Finance and Administration Committee, Technology Committee and Audit Committee, assisting the Board in managing ASTRI. Below are the committee memberships.

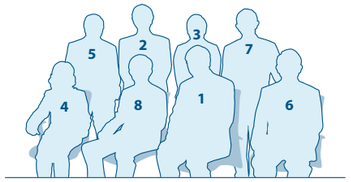
董事也擔任三個功能委員會，即財務與行政委員會、技術委員會及審計委員會的成員。功能委員會協助董事局管理應科院的業務。以下是該些委員會的成員名單。

Finance and Administration Committee	財務與行政委員會
Mr. Roger Luk Koon-hoo , BBS, JP (Chairman until 15 May, 2009)	陸觀豪先生，BBS，JP（主席，直至二零零九年五月十五日）
Mr. Henry Leung Kwong-han (Chairman from 15 May, 2009)	梁廣恆先生（主席，由二零零九年五月十五日起）
Mr. Anthony Au Wai-hung, BBS	區煒洪先生，BBS
Mr. Luther Wong Lok-tak	王樂得先生
Miss Janet Wong Wing-chen, JP	王榮珍女士，JP
Technology Committee	**技術委員會**
Prof. Philip Chan Ching-ho (Chairman)	陳正豪教授（主席）
Mr. Anthony Au Wai-hung, BBS	區煒洪先生，BBS
Mr. Sunny Chai Ngai-chiu	查毅超先生
Prof. Chew Weng-cho	周永祖教授
Dr. Patrick Lam See-pong	林師龐博士
Mr. Henry Leung Kwong-han	梁廣恆先生
Mr. Humphrey Leung Kwong-wai	梁廣偉先生
Mr. Victor Ng Kwok-ho	吳國豪先生
Prof. Vincent Y. Shen	沈運申教授
Mr. Peter Wong King-fai	黃景輝先生
Miss Janet Wong Wing-chen, JP	王榮珍女士，JP
Audit Committee	**審計委員會**
Mr. Richard Sun Po-yuen (Chairman)	孫寶源先生（主席）
Mr. Sunny Chai Ngai-chiu	查毅超先生
Mr. Ben Wong Chung-mat, MH	王忠秣先生，MH
Miss Janet Wong Wing-chen, JP	王榮珍女士，JP

Movements of Directors 董事局成員變動

New Directors 新委任董事	Appointment Date 委任日期
Miss Janet Wong Wing-chen, JP (Official) 王榮珍女士，JP(官守)	14 September, 2009 二零零九年九月十四日
Retired Directors 退任董事	**Retired Date 退任日期**
Mr. Eddy Chan Yuk-tak, JP (Official) 陳育德先生，JP(官守)	14 September, 2009 二零零九年九月十四日
Mr. Roger Luk Koon-hoo, BBS, JP 陸觀豪先生，BBS，JP	15 May, 2009 二零零九年九月十五日
Alternate Directors 替代董事	**Appointment Status 委任情況**
Mr. Eddy Chan Yuk-tak, JP (Official) 陳育德先生，JP(官守)	Retired on 14 September, 2009 as alternate to Mr. Duncan W. Pescod, JP 二零零九年九月十四日退任替代柏志高先生，JP
Mr. Andrew Lai Chi-wah 黎志華先生	Retired on 14 September, 2009 as alternate to Mr. Eddy Chan Yuk-tak, JP 二零零九年九月十四日退任替代陳育德先生，JP Appointed on 14 September, 2009 as alternate to Miss Janet Wong Wing-chen, JP 二零零九年九月十四日委任替代王榮珍女士，JP
Mr. Gordon Leung Chung-tai 梁松泰先生	Retired on 14 September, 2009 as alternate to Mr. Eddy Chan Yuk-tak, JP 二零零九年九月十四日退任替代陳育德先生，JP
Miss Janet Wong Wing-chen, JP (Official) 王榮珍女士，JP(官守)	Appointed on 14 September, 2009 as alternate director to Mr. Duncan W. Pescod, JP 二零零九年九月十四日委任替代柏志高先生，JP

Senior Executives
高級行政人員



As at 31 March, 2010, senior executives include:

CEO
Dr. Cheung Nim-kwan, Chief Executive Officer [1]

Headquarters
Dr. Manuel F. Costa, Chief Technology Officer [2]
Ms. Anita Ho, Human Resources Director [3]
Ms. Betty Law, Chief Finance Officer [4]
Mr. David Poon, Vice President, Corporate Communications & Company Secretary [5]

R&D Groups
Dr. Chao Shen-chang, Vice President and Group Director, Enterprise & Consumer Electronics Group [6]
Dr. Wang Keh-chung, Vice President and Group Director, IC Design Group [7]
Dr. Wu Enboa, Vice President and Group Director, Material & Packaging Technologies Group [8]

截至二零一零年三月三十一日，高級行政人員名單如下：

行政總裁
行政總裁 張念坤博士 [1]

總部
首席科技總監 郭文偉博士 [2]
人力資源部總監 何寶瑛女士 [3]
首席財務總監 羅翠萍女士 [4]
副總裁(傳訊)及公司秘書 潘占達先生 [5]

研發群組
企業與消費電子群組 副總裁及研發群組總監
趙盛章博士 [6]
集成電路設計群組 副總裁及研發群組總監
王克中博士 [7]
材料與構裝技術群組 副總裁及研發群組總監
吳恩柏博士 [8]

Annual Remuneration of ASTRI's Senior Executives 應科院高級行政人員薪酬

Post 職級	Annual Remuneration 1 April, 2009 - 31 March, 2010 (HK$M) 由二零零九年四月一日至 二零一零年三月三十一日全年薪酬(百萬港元)
Chief Executive Officer 行政總裁	3.6
4 level one executives 四名一級員工	8.9
23 level two executives 二十三名二級員工	28.7

Annual Remuneration 1 April, 2009 - 31 March, 2010 (HK$) 由二零零九年四月一日至二零一零年三月三十一日全年薪酬(港元)	Number of Senior Executives 高級行政人員數目
1,000,000 or below 或以下	4
1,000,001 - 1,500,000	11
1,500,001 - 2,000,000	9
2,000,001 - 2,500,000	3
2,500,001 - 3,000,000	0
3,000,001 - 3,500,000	0
3,500,001 - 4,000,000	1

A Growing Workforce
茁壯的人力資源

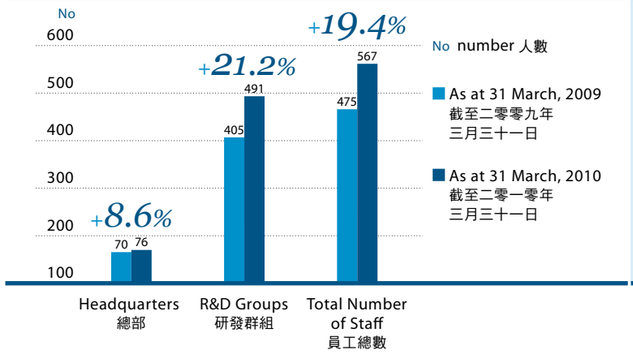
In the year under review, the Human Resources Department continued to support ASTRI in recruiting staff with knowledge and expertise in different areas. As at 31 March, 2010, the total ASTRI workforce stood at 567. The number of R&D staff increased by 86 to 491. Meanwhile, ASTRI headquarters added six new members.

過去一年人力資源部繼續為公司招聘在不同領域富知識和經驗的人才。截至二零一零年三月三十一日，應科院員工總數為五百六十七人。研發人員增加了八十六人至四百九十一人。同時，應科院總部新增了六名員工。

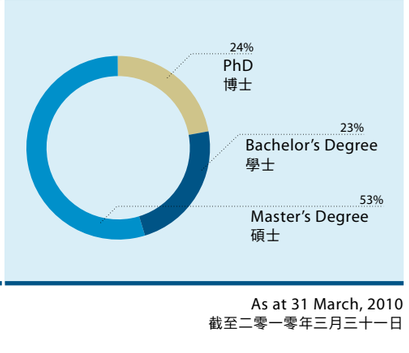
Headcount Status
員工人數

		As at 31 March, 2009 截至二零零九年 三月三十一日	As at 31 March, 2010 截至二零一零年 三月三十一日
Headquarters	總部	70	76
R&D Group	研發群組		
Communications Technologies	通訊技術	144	141
Enterprise & Consumer Electronics	企業與消費電子	120	132
IC Design	集成電路設計	47	94
Material & Packaging Technologies	材料與構裝技術	90	115
Bio-Medical Electronics (team)	生物醫學電子(組)	4	9
Total	總數	475	567

Percentage Growth of ASTRI Staff
應科院員工增長百分比



Academic Qualification of R&D Staff
研發人員學歷



As at 31 March, 2010
截至二零一零年三月三十一日

Young Ambassadors 青年大使

One important ASTRI goal is to nurture the next generation of technological human resources. Many young and fresh university graduates join ASTRI's R&D teams every year. The following are young ambassadors' sharing of their work experience at ASTRI.

培育下一代科技人才是應科院的其中一個重要目標。每年都有不少剛從大學畢業的青年人加入本院的科研行列。且聽聽青年大使們分享他們在應科院工作的感受。

"Working for ASTRI is a very pleasant experience. All the seniors I met are very open-minded and supportive and they are very good mentors.
在應科院工作感覺很開心，我所遇到的上級都是思想開明、支持後輩的，他們是我的良師益友。"

Ms. Echo Shan Qing 山青女士
Project Intern (Joined in 2008)
Bachelor of Automation and Computer-Aided Engineering, CUHK
實習研究員(二零零八年入職)
香港中文大學自動化與計算機輔助工程學士

"From a project intern to becoming an engineer is a very good start. I am optimistic about my career prospects at ASTRI.
由實習研究員晉身成為工程師，是一個美好開始，令我對自己在應科院的發展充滿憧憬。"

Mr. Dickson Leung 梁狄信先生
Software Engineer (Joined in 2008)
MPhil, Electronic Engineering, CityU
工程師(二零零八年入職)
香港城市大學電子工程哲學碩士

"ASTRI is at the forefront of technologies. If you are interested in pursuing a career in R&D, ASTRI is no second choice.
應科院時刻走在科技的最前線。如果您有意投身研發事業，一展所長，應科院是不二之選。"

Dr. Peter Chan 陳永洲博士
Principal Engineer (Joined in 2006)
PhD, Electronic Engineering, HKUST
主任工程師(二零零六年入職)
香港科技大學電子工程博士

"ASTRI offers an excellent environment for nurturing young engineers. I will definitely encourage my friends to join this fine institute.
應科院是一個培養新晉工程師的理想地方。我非常樂意推介朋友加入這所優秀的研究院。"

Ms. Zheng Ying 鄭穎女士
Engineer (Joined in 2008)
MPhil, Electrical & Electronic Engineering, HKU
工程師(二零零八年入職)
香港大學電子電機工程哲學碩士

"If you have passion for innovation and discovery, you will find working at ASTRI real fun and challenging.
如果您熱切追求創新和發掘新事物，您將會發現在應科院工作充滿樂趣和挑戰。"

Mr. Victor So 蘇偉杰先生
Engineer (Joined in 2007)
MSc, IC Design Engineering, HKUST
工程師(二零零七年入職)
香港科技大學集成電路設計工程理學碩士

"ASTRI offers such diversity and exposure which are incomparable. I am always encouraged to use my imagination and make new attempts.
應科院讓我獲得豐富經驗，擴闊了我的視野，實在難能可貴。我時常得到鼓勵，要好好運用想像力和多作新嘗試。"

Mr. Morton Mo 巫桂洪先生
Project Intern (Joined in 2009)
MPhil, Electronics & Computer Engineering, HKUST
實習研究員(二零零九年入職)
香港科技大學電子及計算機工程哲學碩士

Honours for Staff
員工的卓越成就

Technological Achievement Award, 2009 Hong Kong Awards for Industries

An R&D team of ASTRI successfully built the core technologies for TD-LTE terminal and femtocell and won the award out of 40 entries. LTE is next generation wireless communication standard endorsed by major mobile carriers in the world for seamless migration from 3G towards 4G mobile communications.

Winning Team: The team was led by R&D Director Dr. Henry Ye Hui. His teammates are Dr. Wang Yan, Mr. Wong Cheong-yui, Dr. Frank Fang Zuyuan, Mr. Xu Lei, Dr. Peter Chan Wing-chau, Mr. Raymond Lee Yan-lam, Dr. Victor Kwan Man-wai, Mr. Jacky Zhao Xueyuan, Mr. Liu Shujun, Mr. Thomas Guo Xuefeng, Dr. Derek Lee Chun-kit, Dr. Wang Jing, Dr. Li Tao, Dr. Zhang Kai, Dr. Elva Wang Cheng, Mr. Chris Leung Ching-hong, Ms. Zhao Xiyun, Dr. Xu Jun, Dr. Eric Tsang Kong-chau, Mr. Wang Tso, Mr. Gong Bin, Dr. Herbert Chan Ho-yin, Dr. Robert Luo Hongbo, Mr. Michael Cheung Tin-tak, Dr. Ma Mengyao, Mr. Wu Shangzhi, Mr. Bob Wong Ka-man, Mr. Wong Kim-hung, Dr. Yu Wei, Dr. Wei Zhenyu, Mr. Zhang Song, Dr. Samuel Liu Feng, Mr. Cheng Qi, Mr. Eric Leung Yat-fai, Mr. George Wong Wai, Mr. Peng Mingjie, Ms. Wu Xiaoting and Mr. Frankie Tam Kin-wai.

二零零九年香港工商業獎科技成就獎

應科院一隊研發團隊成功開發的TD-LTE終端機和TD-LTE家用基站的核心技術，在40餘參賽作品中脫穎而出。LTE為新一代無線通訊技術標準，可支援3G無線網絡並拓展至4G網絡的服務領域，該標準現已獲得世界多家主要無線網絡營運商的支持。

獲獎團隊：由研發總監葉暉博士領導，團員包括汪岩博士、黃昌銳先生、方祖元博士、徐雷先生、陳永洲博士、李欣霖先生、關文偉博士、趙學淵先生、劉樹軍先生、郭學峰先生、李俊傑博士、王靜博士、李濤博士、張凱博士、王琤博士、梁靖康先生、趙細云女士、徐軍博士、曾江州博士、王佐先生、龔斌先生、陳浩賢博士、羅洪波博士、張天得先生、馬夢瑤博士、伍尚智先生、黃家文先生、黃劍雄先生、俞偉博士、魏振宇博士、張嵩先生、劉峰博士、程琦先生、梁逸暉先生、黃為先生、彭明杰先生、吳霄婷女士及譚健威先生。

Dr. Henry Ye (back row, third from right) with the LTE team
葉暉博士（後排右三）與LTE研發隊員合攝

Dr. Liang Tak-keung (right) receives the award on behalf of ASTRI
梁德強博士（右）代表應科院接受獎座

Dr. Lam Sio-kuan (right) receives the Certificate of Merit
林小軍博士（右）接受優異獎獎狀

Silver Award, Best Lifestyle, Hong Kong ICT Awards 2009

ASTRI won this award with the newly developed LED street lamp. The LED driven lighting has the advantages of high brightness, low power consumption, environmentally friendliness and long lifespan. Most importantly, the lamp can save 30-40 per cent more energy compared to conventional light source. Moreover, the modularized design of light engine enables manufacturers to reduce production cost.

Winning Team: Dr. Liang Tak-keung, technology platform overview and technical development; Dr. Liu Yang, project management; Mr. Ken Ding, mechanical development; Mr. Alden Leung, driver and power supply development; and Mr. Ken Ho, product design.

Certificate of Merit, Best Lifestyle, Hong Kong ICT Awards 2009

This project aims at developing optical anti-shaking technology for camera phone application by using novel voice coil motor (VCM) technology to overcome size limitation of existing traditional optical anti-shaking technologies and enhance the competitiveness of the next generation high-end camera phone.

Winning Team: Dr. Lam Sio-kuan, inventor and project leader; and Mr. Keith Fan, implementation and project execution.

二零零九年香港資訊及通訊科技獎最佳生活時尚獎銀獎

應科院開發的LED路燈榮獲此獎項。LED路燈具備亮度高、節能環保和壽命長等眾多優點，較傳統燈源節省約百分之三十至四十的能源。此外，特殊的光引擎模組化設計，有助生產商降低研發及生產成本。

獲獎團隊：梁德強博士，技術平台監察及技術發展指導；劉洋博士，項目管理；丁德亮先生，機械開發；梁志豪先生，電源及電路設計及開發；何耀權先生，產品設計。

二零零九年香港資訊及通訊科技獎最佳生活時尚獎優異證書

得獎項目是針對攝像手機攝像模組而開發的光學防抖動科技，使用自主研發的音圈電機馬達技術，來克服傳統光學防抖動技術的尺寸限制問題，從而增強新一代高端攝像手機的競爭性。

獲獎團隊：林小軍博士，發明者及項目總監；范永明先生，項目執行。

The winning team at the prize presentation ceremony, (from left) Mr. Li Yangang; Prof. Song Jian from the Research Institute of Information Technology (RIIT), Tsinghua University; Dr. Danny Ong Chung-yen; and Dr. Ding Quan-long
獲獎團隊於頒獎禮上合攝，(左起)李彥剛先生、清華大學信息技术研究院宋健教授、翁中淹博士及丁泉龍博士

ASTRI-Tsinghua University Multimedia Broadcasting and Communications Joint Research Lab
應科院－清華大學多媒體廣播與通訊聯合研究實驗室

Certificate of Merit, Best Collaboration (Greater China Market), Hong Kong ICT Awards 2009;
Certificate of Merit, Best Collaboration (Most Innovative Project), Hong Kong ICT Awards 2009

The Best Collaboration category of the Hong Kong ICT Awards recognises outstanding collaboration with Mainland or overseas partners in creating business opportunities. The DTMB terminal equipment testing and verification platform jointly developed by ASTRI-Tsinghua University Multimedia Broadcasting and Communications Joint Research Lab and its partner Rohde & Schwarz, to support the roll-out of digital TV broadcasting in Hong Kong was honoured with two certificates of merit.

Winning Team: Dr. Ding Quan-long, Director; Dr. Danny Ong Chung-yen, Principal Consultant; Mr. Li Yangang, Senior Manager; and Dr. Elaine Zhang Jihui, Senior Engineer.

二零零九年香港資訊及通訊科技獎
最佳協同合作獎優異證書(大中華市場)；
二零零九年香港資訊及通訊科技獎
最佳協同合作獎優異證書(最具創意項目)

最佳協同合作獎是為表揚與內地或海外伙伴合作，從而創造商機的優秀表現而設。由應科院－清華大學多媒體廣播與通訊聯合研究實驗室夥拍羅德史瓦茲合作開發的數碼電視終端設備測試及驗證平台，令數碼電視廣播在香港得以順利推行，因而獲頒授兩張優異證書。

獲獎團隊：總監丁泉龍博士、首席顧問翁中淹博士、高級經理李彥剛先生及高級工程師張繼輝博士。

Award of Merit, Energy Saving Product Award of Environmental Protection & Friendly Business Award 2009, Hong Kong

The intelligent solution originated from energy saving and environmental protection concepts, providing both general illumination and various colour effects, is a truly "plug & play" retrofit lighting solution for commercial and retail sectors.

Winning Team: Mr. Adam Wu, Project Leader and MR16 Luminaire Designer; Ms. Sammie Wan, MR16 Colour LED Package Designer; Mr. Jacky Leung, MR16 Intelligent Network Hardware Designer; and Mr. Terence Cheung, MR16 Intelligent Network Software Designer.

Best Paper Award, International Conference on Electronic Packaging Technology & High Density Packaging (ICEPT-HDP) 2009, China

ASTRI developed a new PoP structure employing a new bottom package which is over in molded Fine-pitch Ball Gird Array (FBGA) format with a mechanically balanced package structure. The new structure has been developed to address the stand-off and warpage issues found in traditional PoP module. A complete set of PoP solutions including package design and manufacturing processes has been established and prototype samples were built.

Winning Team: Dr. Daniel Shi, Team Supervisor; Dr. Sun Peng, Co-author of the paper; Dr. Debbie Yang, Co-author of the paper; and Mr. Vincent Leung, Co-author of the paper.

二零零九年香港環保「友」道企業大賞節能產品獎優異獎

獲獎的照明系統是基於節能環保概念而開發，這個隨插即用的系統除了提供基本照明外，燈光也可調變成不同色彩，商用及零售照明均適合。

獲獎團隊：胡啟釗先生，項目經理及MR16燈具設計；溫珊媚女士，MR16彩光LED構裝設計；梁振佳先生，MR16無線網絡硬件設計；張智恒先生，MR16無線網絡軟件設計。

二零零九年中國電子構裝技術及高密度構裝國際會議最佳論文獎

應科院開發的新款堆疊構裝結構，其底部構裝採用了結構平衡的注塑成型細間距球柵陣列構裝。這一新結構可以解決傳統堆疊構裝中遇到的器件翹曲和z軸高度方向空間不足的問題。應科院已開發了一套完整的方案，包括構裝設計、製作工藝和樣品。

獲獎團隊：史訓清博士，小組主管；孫鵬博士，論文合著者；楊丹博士，論文合著者；梁志權先生，論文合著者。

Mr. Adam Wu (second from right) at the award ceremony
胡啟釗先生(右二)於頒獎禮上攝

Award in hand, Dr. Sun Peng flashes a broad smile
一獎在手，孫鵬博士露出燦爛笑容

Merck Award for Outstanding Scientific Contribution to the Display Technology, International Meeting on Information Display (IMID) 2009, Seoul, South Korea

Display System Division's LED Programme of MPT won the award for its paper entitled "Large-size LCD with Multi-touch Sensing Capability". The accolade was presented to ASTRI at the 9th IMID 2009 held in Seoul, South Korea in October, 2009. The Merck Awards honour outstanding scientific contributions to display technologies.

Winning Team: The team authored the paper under the direction and supervision of Director Dr. Tsai Chen-jung. Team members included Senior Engineer Dr. Zhu Xiuling; Engineers Ms. Cass Sit Ka-man, Mr. Mark Wei-feng and Mr. Feng Yaojun; and Manager Mr. Ng Kwan-wah.

二零零九年韓國國際信息顯示會議傑出科學貢獻默克獎

材料與構裝技術群組發光二極體技術顯示系統組以「具多點觸控功能的大型LCD」為題的論文奪得此榮譽。頒獎禮於二零零九年十月在南韓首爾第九屆國際信息顯示會議中舉行。默克獎是為表揚對顯示器技術有傑出科學貢獻的人士而創立。

獲獎團隊：得獎團隊在總監蔡振榮博士指導下完成論文，成員包括高級工程師朱秀玲博士、工程師薛嘉敏女士、魏峰先生、馮耀軍先生和經理吳均華先生。

Mr. Ng Kwan-wah (third from left) with other award winners in Seoul
吳均華先生(左三)於首爾舉行的頒獎禮上與其他得獎者合攝

Reaching Out to Community
服務社群

Inspiring Hong Kong Youth 激發香港年青新一代

Pictured with children during a visit to Dangpi, Sichuan
前往四川當批探訪，與當地兒童合攝

Trail-blazing in Chile
遠赴智利，開闢山徑

Dr. Lydia Leung, a manager of the MPT Group, joined a three-month expedition to Chile in 2003 to build a school, a playground and a hiking track for the local community. She was one of the so-called "Venturers" recruited by Raleigh, an international youth development charity, to do voluntary works in remote areas with an aim to inspiring youth to explore their full potential.

Since then, Lydia has become an active Raleigh member and later joined its Executive Committee. As much as ASTRI nurtures talents for industry, Lydia is devoted to bringing up youth in Hong Kong, helping them build leadership skills and self-confidence, and making a difference to the community and environment where they live.

應科院經理梁立慧博士曾於二零零三年遠征智利，參加一個為期三個月的歷險旅程，為當地社區建設了一所學校、一個操場和開闢了一條行山徑。她是雷利計劃所招募的「歷險家」。雷利計劃是一個國際青少年發展慈善團體，目的是透過讓年青人在落後地區進行義務工作，激發他們的潛能。

梁立慧自此成為雷利計劃的活躍會員，其後她加入了執行委員會，負責培育香港年青新一代，建立他們的領導才能及自信，共同服務社區，改善環境，與應科院為業界培育人才的理念同出一轍。

Saving Children's Sight 為弱視兒童帶來光彩明天

As a senior engineer developing training devices for treating amblyopia, Ms. Alice Chow found her job even more meaningful after joining a China tour organized by OSJ Radiant Foundation in 2009.

Together with 15 volunteers including ophthalmologists and nurses, she visited amblyopia patients in a Beijing hospital. They also checked and screened the eyes of 850 children in Henan and offered free consultations to those with visual problems.

The visit made Alice realize that portable eye training devices, such as the stand-alone goggle being developed by ASTRI, will greatly benefit patients living in remote areas.

Alice Chow (right) visiting children in a Beijing eye hospital
周洋明(右)於北京眼科醫院探訪兒童病人

周洋明女士是應科院的高級工程師，專門研究治療弱視的訓練儀器。周洋明於二零零九年跟隨聖約翰爵士兒童弱視基金會，前往內地進行探訪，此行令她更加覺得她的研究工作別具意義。

周洋明與義工團，當中包括眼科醫生和護士一行十五人，先抵達北京一所醫院，探訪弱視病人。隨後他們前往了河南，為八百五十名兒童進行視力檢驗和普查，並為懷疑有弱視問題的兒童提供免費診斷。

此行令周洋明深深明白到便攜式的眼部訓練儀，好像應科院目前正在開發的獨立視覺治療目鏡，將可以令生活在偏遠地區的病人大大受惠。

External Appointments
外界任命

External appointments held by senior staff for the period 1 April, 2009 to 31 March, 2010.

下列為高級員工於二零零九年四月一日至二零一零年三月三十一日期間，獲外界委任的職務。

Dr. Cheung Nim-kwan, Chief Executive Officer	行政總裁 張念坤博士
Member of Board of Directors, Institute of Electrical and Electronics Engineers	國際電機電子工程師學會董事局成員
Member, Research Grants Council, Education Bureau of HKSAR	香港特區政府教育局研究資助局委員
Honorary Professor, Faculty of Engineering, The Chinese University of Hong Kong	香港中文大學工程學院榮譽教授
Member, Innovation and Technology Advisory Committee, Hong Kong Trade Development Council	香港貿易發展局創新及科技諮詢委員會委員
Member, Electronics/ Electrical Appliances Industries Advisory Committee, Hong Kong Trade Development Council	香港貿易發展局電子及電器產品業諮詢委員會委員
Member, Advisory Committee, Department of Computing, The Hong Kong Polytechnic University	香港理工大學電子計算學系諮詢委員會委員
Prof. Edward Yang, Senior Adviser to CEO	資深顧問 楊雄哲教授
Adjunct Professor, Faculty of Engineering, The Chinese University of Hong Kong	香港中文大學工程學院客席教授
Honorary Professor, Department of Electrical and Electronics Engineering, The University of Hong Kong	香港大學電機電子工程學系榮譽教授
Prof. Peter Yum Tak-shing, Senior Adviser to CEO	資深顧問 任德盛教授
Member, Appeal Tribunal Panel, Building Ordinance (Cap.123), Planning and Lands Branch, Development Bureau, Government Secretariat, HKSAR	香港特區政府總部發展局規劃地政科建築物條例(第123章)上訴審裁小組委員
Member, Disciplinary Tribunal Panel, Electricity Ordinance (Cap.406), Environment Bureau, Government Secretariat, HKSAR	香港特區政府總部環境局電力條例(第406章)紀律審裁小組委員
Editor, Institute of Electrical and Electronics Engineers Transaction on Communications	國際電機電子工程師學會Transaction on Communications編輯
Senior Technical Editor, Institute of Electrical and Electronics Engineers Communications Magazine	國際電機電子工程師學會通訊雜誌高級技術編輯
Professor of Information Engineering, The Chinese University of Hong Kong	香港中文大學信息工程學教授
Chair Professor, Institute for Theoretical Computer Science, Tsinghua University, Beijing	北京清華大學理論計算機科學研究中心講座教授
Vice-editor-in-chief, Chinese Journal of Electronics	中國電子學報副主編

Dr. Chao Shen-chang, Vice President and Group Director	趙盛章博士 副總裁及研發群組總監
Advisory Member, Advancing Technology for Digital Home	數字家庭技術進展顧問委員會委員
Adviser, e-Learning Technical Advisory Council, Hong Kong Education City Ltd.	香港教育城電子學習技術諮詢委員
Adviser for External Advisory Committee, Computer Science Department, The Hong Kong University of Science and Technology	香港科技大學計算機科學系外部諮詢委員會委員
Dr. Wang Keh-chung, Vice President and Group Director	王克中博士 副總裁及研發群組總監
Chair and Member, MTT-9 Technical Coordinating Committee, "Digital Signal Processing", Institute of Electrical and Electronics Engineers	國際電機電子工程師學會MTT-9技術聯絡委員會「數碼訊號處理」分會主席及委員
Chair and Member, International Microwave Symposium, Technical Programme Committee - Area 24 "Digital Processing Circuits and Systems at GHz Speed", Institute of Electrical and Electronics Engineers	國際電機電子工程師學會國際微波會議技術項目委員會第二十四領域「GHz速率數碼訊號處理電路與系統」分會主席及委員
Executive Board Director and Chair, Southern California Monte Jade Science and Technology Association, U.S.	美國南加州玉山科技協會執行董事及分會主席
Dr. Wu Enboa, Vice President and Group Director	吳恩柏博士 副總裁及研發群組總監
Expert, Bureau of Information and Technology, Fujian Province, China	中國福建省信息化局專家
Advisory Committee Member and Board Director, China Solid State Lighting Alliance	國家半導體照明工程研發及產業聯盟指導委員會委員及理事
Solid State Lighting Technical Consultant, China Illuminating Engineering Society	中國照明學會半導體照明技術顧問
Lighting Consultant, Guzhen, Guangdong Province, China	中國廣東省古鎮照明顧問
Chairman, LED Application Session, China Solid State Lighting International Forum	中國半導體照明國際論壇LED應用分會主席

Dr. Tom Chung Chang-hwa, Vice President and R&D Director	仲鎮華博士 副總裁及研發總監
Vice President, China Electronics Packaging Society	中國電子封裝專委會副總裁
Expert, Guangdong Advanced Microelectronics Packaging and Testing Engineering Technology Centre	中國廣東省先進微電子封裝測試工程技術研究開發中心專家組專家
Organizing Committee Member and Technical Chair, Electrical Design of Advanced Packaging & Systems Symposium 2009, Institute of Electrical and Electronics Engineers	國際電機電子工程師學會二零零九年專業封裝與系統電子設計研討會籌備委員會成員及技術委員會主席
International Adviser and Technical Co-Chair, Joint International Conference on Electronic Packaging Technology and High Density Packaging 2009	二零零九年電子封裝技術和高密度封裝國際會議顧問委員會成員及技術委員會共同主席
Technical Programme Chair, Electrical Design of Advanced Packaging & Systems Symposium 2009, Institute of Electrical and Electronics Engineers	二零零九年國際電機電子工程師學會專業封裝與系統電子設計研討會技術委員會主席
DAC Member, Manufacturing Engineering and Engineering Management Department, The City University of Hong Kong	香港城市大學製造工程及工程管理學系幹事會成員
Dr. Francis Lee Chee-shuen, Vice President and R&D Director	李致淳博士 副總裁及研發總監
Panellist in Programme Accreditation, Master of Science in Green Technology, The Hong Kong Baptist University	香港浸會大學綠色科技理學碩士課程認可小組成員
Dr. James Lei Zhibin, Director	雷志斌博士 總監
Reviewer, Institute of Electrical and Electronics Engineers Communications Magazine	國際電機電子工程師學會通訊雜誌評審員
Dr. Li Geng, R&D Director	李耕博士 研發總監
Visiting Professor, Medical Imaging Centre, The First Affiliated Hospital, Jinan University, Guangzhou, China	中國廣東省濟南大學第一附屬醫院醫學影像中心客席教授
Visiting Assistant Professor, Image-Guided Therapy Programme, Surgical Planning Laboratory, Department of Radiology, Brigham and Women's Hospital, Harvard Medical School, Boston, U.S.	美國波士頓哈佛醫學院布里格姆婦女醫院放射科手術計劃實驗室影像導航治療議程客席助理教授
Visiting Professor, Department of Neurology, The First Affiliated Hospital, Sun Yat-sen University of Medical Sciences, Guangzhou, China	中國廣東省孫中山醫科大學第一附屬醫院神經內科客席教授
Dr. Jay Liou, Director	劉遠昭博士 總監
Editorial Member, Advancing Technology for Digital Home	數字家庭技術進展編委會委員
Dr. Tsai Chen-jung, Director	蔡振榮博士 總監
Executive Committee Member, The 4th China International Forum on Novel Light and Energy Sources	第四屆中國國際新光源新能源照明論壇執行委員會委員

Reports of R&D Groups and Subsidiary
研發群組及附屬機構報告

Innovative **minds** in motion
發揮創意，實踐科研

RF Tuner for HDTV
高清電視射頻調諧器

High Definition Television (HDTV) USB dongle equipped with RF tuner enables TV viewers to enjoy quality HDTV programmes anytime and anywhere
配備射頻調諧器的高清電視USB數據卡，讓用户可以隨時隨地欣賞優質高清電視節目

Communications Technologies Group
通訊技術群組

The Communications Technologies Group focuses on sustaining and disruptive wireless communication technologies and intellectual properties, addressing technical challenges for local industry.
通訊技術群組著重發展持續性和突破性的無線通訊技術和知識產權，為業界突破技術瓶頸。

The Communications Technologies (CT) Group focuses on sustaining and disruptive wireless communication technologies and intellectual properties, addressing technical challenges for local industry. Broadband Wireless Access, Digital Terrestrial and Mobile TV, RF Transceiver, and Antenna and Digital-RF Technologies are identified as key R&D directions. They are in line with global and local technology and industry trends. High value-added applications are also incorporated.

During the year under review, the R&D team working on biomedical electronics was transferred to the newly established BME Team. The R&D team working on Material and Miniaturization was transferred to the MPT Group. Meanwhile, R&D capabilities in wireless baseband and RF transceiver were strengthened to serve industry's demands.

The Group achieved fruitful results during the year in income from industry, technology transfer and patent application. Key technological achievements are highlighted in the following paragraphs.

通訊技術群組著重發展持續性和突破性的無線通訊技術和知識產權，為業界突破技術瓶頸。寬頻無線通訊、數碼地面與移動電視、射頻收發器及天線與數碼射頻設計技術都是該群組的主要研發方向，與全球及本地的無線通訊技術和產業發展趨勢相互呼應，同時也配合高增值應用。

年內負責研發生物醫學的團隊已轉移到新成立的生物醫學電子組，而研發材料與微型化技術的團隊已轉移到材料與構裝技術群組。與此同時，群組增強在無線通訊基帶與射頻調接技術的研發能力，以配合業界需要。

通訊技術群組本年度在業界收入、技術轉移及專利申請方面的成績彪炳，主要技術成果於下面章節闡述。

Review 回顧

LTE Femto Cell prototype and reference design
LTE家庭基站的原型機及參考設計

Broadband Wireless Access

The Practical MIMO/LTE team made a breakthrough and came up with the world's first TD-LTE baseband chip supporting 20MHz bandwidth for data card application. The Group developed system designs, algorithms, FPGA and DSP. Business partner Innofidei transferred the technologies and developed the baseband chip, which China Mobile, the largest cellular operator on the Mainland, used to conduct the world's first TD-LTE commercial trial at the 2010 Shanghai World Expo.

The chip was integrated in the data card USB dongle manufactured by Lenovo. It is the only terminal chip which passed all interoperability tests (IOT) with TD-LTE base stations developed and provided by world-leading wireless equipment companies including Motorola, Alcatel-Lucent Shanghai Bell and ZTE and successfully exhibited multiple mobile applications with high definition video quality such as video monitoring, real-time video streaming, video-conference and video-on-demand at the Expo.

The WiMAX and Wireless Software team established a flexible Mobile WiMAX Base Station Core supporting IEEE 802.16e standard. WiMAX Wave 2 MIMO is supported. The Base Station Core can be easily customized to produce different configurations including macro, micro, pico and femto. A cost-effective WiMAX Access Network Gateway (ASN-GW) and its IOTs with base stations from different vendors including the Institute for Information Industry, Alpha Network and Runcom were successfully completed. Based on in-house technologies and platforms, a WiMAX demo site was set up in the Hong Kong Science Park to showcase and promote the Group's R&D results.

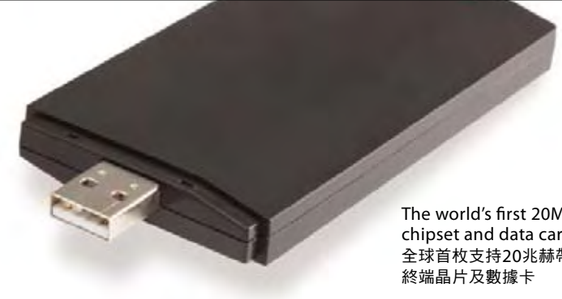
寬頻無線通訊

實用多天線/長期演進(LTE)技術團隊在技術上達成重大突破，成功開發出全球首枚支持20兆帶寬，適合數據卡應用的TD-LTE基帶晶片，並開發了系統設計、算法、FPGA與DSP設計。合作夥伴創毅視訊將這些技術轉移，並研發基帶晶片，後獲全國最大的流動通訊運營商中國移動選用，在二零一零年上海世界博覽會利用該基帶晶片進行全球首次TD-LTE商業運行測試。

該基帶晶片被成功整合在聯想的數據卡中。這也是唯一率先通過所有國內外領先的無線通訊網路設備廠商，如摩托羅拉、阿爾卡特朗訊上海貝爾、及中興通訊的TD-LTE基站相互操作性測試(IOT)的終端晶片。在世博會成功展示許多高清視訊質素的移動應用，如視訊監視、即時視訊傳流、視訊會議及互動視訊服務等。

WiMAX與無線軟件技術團隊建立支持IEEE 802.16e制式的靈活移動WiMAX基站核心技術，同時可以為各種基站定制配置，包括macro、micro、pico及femto。該技術團隊也開發極具成本效應的WiMAX接入網網關技術平台，並完成與台灣資策會、Alpha Network及Runcom基站的互操作性測試。團隊又以自行研發的技術與平台，在香港科學園建立了一套WiMAX系統，來展示及推廣群組的研發成果。

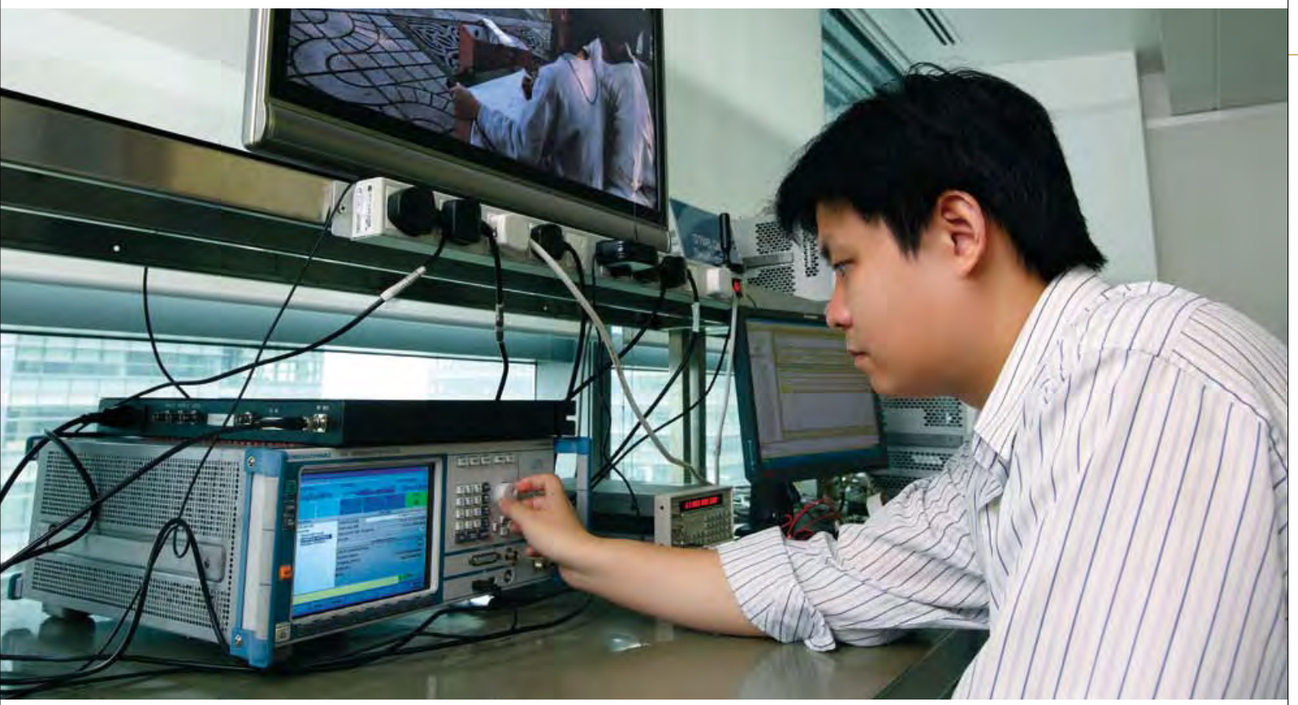
The group developed the world's first TD-LTE baseband chip supporting 20MHz bandwidth for data card application
群組成功開發出全球首枚支持20兆帶寬、適合數據卡應用的TD-LTE基帶晶片



The world's first 20MHz TD-LTE chipset and data card
全球首枚支持20兆赫帶寬的TD-LTE終端晶片及數據卡

4G Cellular (LTE-A)
第四代流動電話系統

4G Cellular (LTE-A) provides mobile users with ultra-broadband Internet access and multimedia communications services
第四代流動電話系統(LTE-A)，為流動用戶提供超寬帶互聯網及多媒體通訊服務



Engineer testing the DTMB receiver system
研發工程師正在實時測試DTMB接收機

Digital Terrestrial and Mobile TV

The ASTRI-Tsinghua University Multimedia Broadcasting and Communications Research Joint Lab (MBC Joint Lab) continuously contributed to Digital Television Terrestrial Multimedia Broadcasting (DTMB) technology advancement and deployment in Hong Kong and the Mainland. The R&D scope covers DTMB Foundation Technology Platform, STB Reference Design, Single Frequency Network (SFN) Adaptor and Test Instrumentation. Two certificates of merit in the Best Collaboration category of the 2009 Hong Kong ICT Awards were received due to significant impact of the "DTMB Terminal Equipment Testing and Verification Platform" developed in the MBC Joint Lab.

During the year, the design of the DTMB receiver baseband chip supporting both multi-carrier and single carrier modes with superior performance was developed. Regarding Mobile TV, a reconfigurable OFDM baseband chip compliant to multiple standards, such as CMMB (Mainland), DVB-T/H (Europe) and T-DMB (Korea and Europe) was also developed for portable mobile devices.

數碼地面與移動電視

應科院–清華大學多媒體廣播與通訊聯合研究實驗室(MBC聯合實驗室)持續為香港和內地中國數碼地面多媒體廣播(DTMB)的發展及部署作出貢獻。其研發範圍包括DTMB的基礎技術平台、機頂盒參考設計、單頻網適配器、設備及測試平台等。MBC聯合實驗室的「DTMB終端設備測試和驗證平台」榮獲二零零九年香港資訊及通訊科技獎兩項最佳協同合作優異獎項。

本年度，技術團隊開發優越的多載波與單載波雙模DTMB接收機基帶晶片設計；同時，針對移動電視開發應用於便攜式移動裝置的可重置OFDM基帶解調晶片，適合多種制式，包括CMMB(內地)、DVB-T/H(歐洲)和T-DMB(韓國和歐洲)。

RF Transceiver

The RF Transceiver team, in partnership with technology licensee Vinno, completed the design of a dual-mode CWPAN/Zigbee SoC for wireless sensor networks. It is another milestone following the successful development of a dual-mode CWPAN/ZigBee RF transceiver. The SoC supports both Mainland and global IEEE standards. It has the advantages of extended communication range, as well as better penetration owing to the frequency band and the built-in programmable power amplifier design.

Due to the technology transferred from CT Group, Vinno won the 2009 Technical Innovation Award from the Beijing Municipal Government and was elected Top 10 Innovative Achievements in Zhong Guan Cun, the top high technology centre on the Mainland. Another technology achievement is the multi-mode mobile TV tuner chip supporting CMMB, T-DMB, DVB-T/H and DMB-T/H standards. It is among the best in terms of power consumption, die size and number of external components compared with chips in the market.

Antenna and Digital-RF

The R&D team established leading and competitive design technologies in passive antenna, active antenna, beam-forming antenna and isolation for multiple antennas. During the year, the team delivered the Near-Field Antenna Array design which has the advantage of allowing multiple-image detection resulting in a Magnetic Resonance Imaging (MRI) scan with higher resolution and faster speed. In partnership with Time Medical, a local medical equipment company, the array was used in developing a low-field MRI machine which showed resolution equivalent to a much more expensive high-field MRI system. It is anticipated that the array will benefit the entire MRI medical imaging industry in providing cost-effective MRI machines for use in regional/local hospitals and clinics.

射頻收發器

射頻收發器設計技術團隊授權技術予威訊柴晶，共同開發雙模CWPAN/Zigbee系統單晶片，這是繼雙模CWPAN/Zigbee射頻收發晶片後又一里程碑。該系統單晶片支持中國CWPAN制式與國際IEEE ZigBee制式，由於其使用頻帶和內置可編程功放設計，還具備長距離傳輸與較佳穿透性的優點。

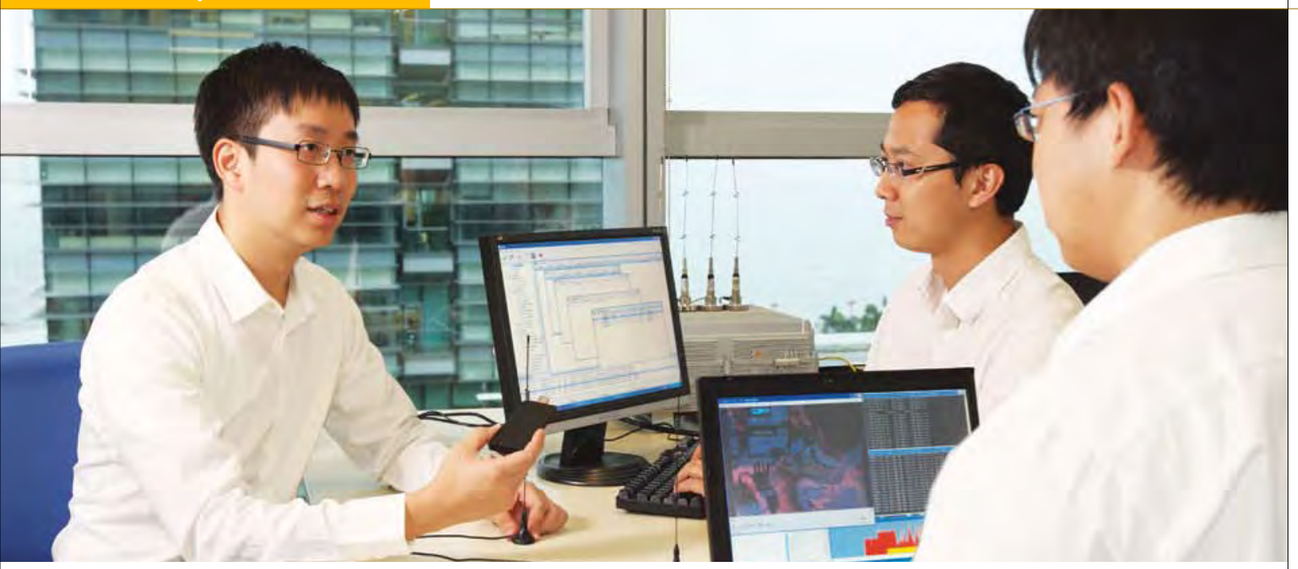
威訊柴晶利用通訊技術群組授權技術而開發的產品，獲評選為內地頂尖高科技中心—北京中關村二零零九年十大企業技術創新成果，並榮獲北京市政府頒贈二零零九年技術創新大獎。另一項技術成就是成功開發支持CMMB、T-DMB、DVB-T/H和DMB-T/H多種制式的多模移動電視調諧器晶片，其功耗、晶片面積、外圍元器件需求等特點都比市面上其它產品優勝。

天線與數碼射頻設計

該技術團隊在無源天線、有源天線、波束形成天線及多天線隔離方面建立了領先且具競爭力的設計技術能力。本年度，團隊完成近場天線陣列設計，促成在磁共振成像儀(MRI)高解析度及快速掃描時多影像的偵測。團隊與本地一家醫療設備公司美時醫療合作，以該近場天線陣列技術，開發低場磁共振成像儀，並展示與昂貴的高場磁共振成像儀相同的解析度。該天線陣列技術將惠及整個磁共振成像儀產業，為區內及本地醫院及診所提供低成本的磁共振成像儀。

Dual-mode CWPAN/ Zigbee SoC was elected Top 10 Innovative Achievements in Zhong Guan Cun, Beijing
雙模CWPAN/Zigbee系統單晶片獲選為北京中關村十大企業技術創新成果

Developments 發展



Completing TD-LTE Interoperability Test (IOT) with major equipment supplier
與主要TD-LTE網絡設備供應商完成互操作性測試

Moving forward, the Group will continue to focus on key R&D directions including Broadband Wireless Access, Digital Terrestrial and Mobile TV, RF Transceiver, and Antenna and Digital-RF Technologies, since they are the mainstream of the wireless communication industry and technology development. However, the vehicles for technology development will vary according to specific demands.

To facilitate research and development, CT needs to leverage resources from universities, industrial consortiums and alliances, and enterprises in Hong Kong and the Mainland. While wireless communication technologies are widely used in consumer electronics and medical electronics, the Group will work closely with other ASTRI R&D Groups and local R&D centres to expand marketing and commercialization scopes for significant industrial impacts.

Broadband Wireless Access

The focus of this direction will shift gradually from WiMAX to LTE in view of market and industrial needs. It is obvious WiMAX core technologies will significantly benefit LTE development.

Following the development of TD-LTE technology, the R&D team will focus on developing an LTE FDD/TDD dual-mode baseband core for both terminal device and Femto base station to address global markets. In addition, a test chip or SoC for LTE terminal device supporting LTE FDD/TDD dual-mode will be developed. This SoC includes dedicated hardware and embedded processors for LTE physical layer, as well as MAC layer and protocol stack functionalities. It supports 2x2 MIMO with peak data rate reaching 100Mbps for down-link and 50Mbps for up-link. The architecture will be optimized for cost-effectiveness via resource sharing between FDD and TDD modes to reduce the die size and power consumption of the design.

通訊技術群組的未來研發方向將主力集中在寬頻無線通訊、數碼地面與移動電視、射頻收發器及天線與數碼射頻技術等幾方面。這些技術仍是未來無線通訊產業與技術發展的主流，然而技術發展的載具將根據產業需求而進行。

通訊技術群組會充分借助外部資源，如本地與內地的大學、產業聯盟與協會、企業等，以促進研發工作。由於無線通訊技術廣泛應用於消費電子及醫療電子行業，群組將加強與應科院其它研發群組及其它本地研發中心合作，以拓展市場及將產品商業化，創造重大的產業效益。

寬頻無線通訊

寬頻無線通訊的研發方向，將逐漸由WiMAX轉向LTE，以配合市場與產業需求。顯而易見WiMAX的核心技術將有利於LTE技術開發。

技術團隊成功開發TD-LTE技術後，將著重研發用於終端設備與家庭基站設備的LTE FDD/TDD雙模基帶核心設計，以配合全球市場需要。同時，技術團隊也發展支持LTE FDD/TDD雙模的LTE終端設備測試晶片或系統晶片。該系統晶片包含LTE物理層與MAC層模塊及支持協議庫功能的專屬硬件設計及嵌入式處理器，並支持2x2多天線系統，下傳速率最高可達100Mbps，上傳速率可達50Mbps。通過FDD與TDD兩個模式資源共享，架構設計將優化以降低晶片面積與功耗，因此更具成本效益。

The team also plans to establish the Hong Kong LTE Demonstration Network to showcase applications including High Definition video streaming over TD-LTE with MIMO, mobile video monitoring and high speed Internet access. This Demonstration Network is a showcase of ASTRI TD-LTE Technology and Hong Kong's capability in advanced R&D. It also provides a platform to develop and test new technologies and applications. Following the completion of the Customizable Wireless Management System (CWMS) and WiMAX Gateway technologies, the R&D team is going to develop an Evolved Packet Core (EPC) Access Gateway for LTE/4G networks. The focuses will be on Mobility Management Entity (MME) and SAE Gateway (Serving GW + PDN GW). The customization technology and the software and hardware platforms established for CWMS and WiMAX ASN-GW will be leveraged to improve designs and offerings.

該技術團隊也計劃在香港建立一套TD-LTE示範網絡展示應用，例如在具備多天線系統的TD-LTE系統上傳送高清視訊、移動視訊監視及高速互聯網接入。這套示範網絡不僅展示應科院TD-LTE技術的研發成就，也體現香港高新科技的研發能力，同時提供一個研發及測試新技術與應用的平台。技術團隊在成功開發可定制無線網絡管理系統（CWMS）及WiMAX接入網網關（ASN-GW）後，將轉移研發LTE/4G接入網絡的EPC網關，並著重於移動管理單元（MME）和SAE網關（S-GW）。CWMS及WiMAX ASN-GW所建立的可定制化技術及軟件與硬件平台，將用作改良設計及產品。

Customizable Wireless Management System
可定制無線網絡管理系統

CWMS enables remote network management through wireless Internet access
CWMS可透過無線上網進行遙距網絡管理

Multi-mode Mobile TV
多模移動電視

Multi-mode Mobile TV solution provides entertainment and information on the road
多模移動電視將資訊及娛樂在旅途中源源送上

Digital Terrestrial and Mobile TV

Future R&D directions will focus on high mobility and highly integrated solutions. Since the existing DTMB network targets at delivering terrestrial digital TV broadcasting services, the enhanced DTMB network technology will be developed to deliver high quality TV signals in high mobility environment for deployment of new applications or services. Besides, an integrated DTMB mobile terminal SoC integrating baseband, RF tuner and 2D graphics video processor/accelerator will be designed, providing a cost-effective total solution for future mobile digital TV devices.

The R&D team will leverage existing technologies/IPs established by ECE Group to speed up the pace of the development of 2D graphics video/processor/accelerator. A few forward looking technologies such as receive diversity, low power mobile DTMB receiver design and Broadband Wireless Multimedia spectrum management will be explored to establish the technology foundation for further advancement.

Regarding Mobile TV, the industrial trend is moving towards multi-mode such as CMMB, T-DMB and DVB-T/H, as well as highly integrated SoC solutions including RF tuner and/or baseband and/or media processor. CT's R&D roadmap is in line with this global industrial trend. The designs of multi-mode baseband and multi-band RF tuner are in place and will be integrated with a media processor from either industry partner or ECE Group for designing a SoC solution.

數碼地面與移動電視

未來研發方向著重高移動性與高整合性技術解決方案。現有的DTMB網絡主要提供地面數碼電視廣播服務，技術團隊將開發增強型DTMB網路，在高速移動環境下改進數據傳送量，以提供嶄新的應用與服務。此外，技術團隊將設計整合型DTMB移動終端系統晶片，包含完整基帶、射頻調諧器及二維圖像視頻處理器/加速器，為未來移動數碼電視產品提供具成本效益的全面解決方案。

技術團隊將借助應科院企業與消費電子群組的技術和知識產權，加快二維圖像視頻處理器/加速器項目開發。同時也為進一步建立技術基礎，探索先進的技術，包括接收分集、低功耗移動DTMB接收器設計與寬帶無線多媒體頻譜管理。

RF Transceiver

The RF Transceiver team will develop a Dual-mode TD-LTE and TD-SCDMA RF Transceiver chip. This transceiver chip will support multiple frequency bands: 1.9 GHz, 2.0 GHz, 2.3GHz and 2.6 GHz, along with programmable bandwidth from 1.4MHz to 20MHz. It also supports MIMO 2x2 for better system performance. Direct conversion, embedded tuning/control circuitry and fully integrated CMOS design with minimum external components are the important features of the RF transceiver.

Antenna and Digital-RF

The R&D team made a strategic decision to move towards a new platform technology for enabling advanced RF and antenna. The target applications are broadcast and communication. Digital Pre-Distortion (DPD) for Power Amplifiers and wide-band base station antennas are the two major R&D focuses. The former one is essential for making base station RF transceivers reconfigurable. The team targets at the wireless standards operating between 1.9 and 2.7 GHz (3G, LTE, WiMax, WiFi). Once the RF transceiver becomes multi-standard, a wide-band base station antenna will be required. The technology platform will be based on prior experiences and IPs in active antennas, beam-forming and isolation in order to create advanced wide-band base station antenna designs.

移動電視產業的發展趨勢邁向多種制式，包括CMMB、T-DMB及DVB-T/H；及高整合型系統晶片，包含射頻調諧器、基帶及媒體處理器。通訊技術群組的發展方向與全球產業趨勢一致，將多制式基帶與多頻射頻解調器設計，結合合作夥伴或企業與消費電子群組的媒體處理器，來設計系統晶片解決方案。

射頻收發器

射頻收發器技術團隊將全力開發TD-LTE與TD-SCDMA雙模射頻收發機晶片，支持多頻段：1.9、2.0、2.3及2.6千兆赫，可調訊號帶寬1.4-20兆赫，並支持2x2多天線以提高系統性能。射頻收發器的獨特性，能降低外接元件使用，包括直接轉換、嵌入調整/控制線路及高整合CMOS設計。

天線與數碼射頻設計

天線與射頻技術團隊以廣播與通訊為目標應用，擬定未來先進射頻與天線設計技術平台的發展策略，著重功率放大器數碼預失真（DPD）和寬帶基站天線兩個主要技術領域。DPD是基站射頻收發器可重新配置的重要技術，團隊將針對所有1.9至2.7千兆赫的無線標準（3G、LTE、WiMAX及WiFi）。射頻收發器一旦成為多標準型，寬帶基站天線則是必要配備。該平台項目在已有的有源天線、波束成形及隔離技術的經驗和知識產權基礎上，設計先進的寬帶基站天線。

Achievements 成果

A total of 11 patents were granted to CT in the fiscal year. The technology areas included antenna design, broadband wireless media access and wireless system signalling. A total of 14 patent applications were filed with the technology areas covering digital broadcasting system, antenna, RF transceiver and QoS of broadband wireless system.

Meanwhile, 34 technology transfer contracts were signed during the year. More than 70 per cent of the customers were from Hong Kong with the remainder from the Chinese Mainland, the United States, the United Kingdom and Taiwan. An amount of $13.86 million income from industry was received for all ITF projects. It accounted for 16.3 per cent of the project expenditure and exceeded CT's 12 per cent target. A total of $10.3 million income from industry were received for ITF platform and full projects. The sum was equivalent to 12.6 per cent of the project expenditure and exceeded CT's 10 per cent target.

Broadband Wireless Access

TD-LTE related technologies were licensed to several world leading wireless communication companies. Following the transfer of the TD-LTE Femto BTS baseband core technology to picoChip, a world leading wireless communication IC and platform solution provider, the offering of the industry's first LTE TDD Femto base station reference design was announced by picoChip at the 4th LTE World Summit. Following the transfer of the TD-LTE terminal baseband core technology to Innofidei, the world's first TD-LTE baseband chip for data card was produced and used by China Mobile in its commercial trial at the 2010 Shanghai World Expo.

Prior to the event, a series of stringent interoperability tests were conducted with major players including Rohde & Schwarz, Agilent, ZTE, Motorola and Alcatel-Lucent. ZTE and ASTRI became the first in the industry to jointly submit the LTE TDD IODT report to LSTI (Long-Term Evolution/System Architecture Evolution Trial Initiative). One tier-one wireless testing equipment vendor also licensed the TD-LTE UE Emulator for developing LTE test equipment.

Invited by Innofidei, Agilent, Rohde & Schwartz, picoChip, Motorola and ZTE, ASTRI demonstrated TD-LTE with MIMO technology delivering wireless high definition videos at major world conferences and exhibitions such as 2009 Mobile World Congress in Barcelona, 2009 and 2010 CTIA in Las Vegas, and 2009 ITU Telecom World in Geneva.

本年度，通訊技術群組獲得十一項專利，涵蓋天線設計、寬帶無線媒體接入及無線通訊系統訊號技術。群組並申請十四項專利，包括數碼廣播系統、天線設計、射頻收發器及寬帶無線通訊系統服務質量等技術領域。

與業界合作方面，群組與客戶簽訂三十四項技術轉移合同，當中超過百分之七十為香港公司，其餘來自內地、美國、英國及台灣。在所有創新及科技基金資助項目中，群組共獲得業界收入一千三百八十六萬元，佔項目總支出百分之十六點三，超越群組百分之十二的目標。單是創新及科技基金資助的平台或正式項目，業界收入達一千零三十萬元，佔項目總支出百分之十二點六，超越群組百分之十的目標。

寬頻無線通訊

TD-LTE相關技術已授權給幾家世界領先的無線通訊公司。TD-LTE家用基站基帶核心技術已轉移給全球領先的無線通訊晶片和平台解決方案供應商picoChip。該公司在第四屆LTE全球高峰會議宣佈推出業內首個TD-LTE家用基站參考設計。TD-LTE終端基帶核心技術已轉移給創毅視訊，用來生產全球首個數據卡TD-LTE基帶晶片，並獲中國移動選用在二零一零年上海世界博覽會進行商業運行測試。

在此之前，應科院應邀與羅德與施瓦茨、安捷倫、中興通訊、摩托羅拉及阿爾卡特朗訊等主要廠商進行了嚴格的互通性測試。應科院與中興通訊更向LSTI（長程演進/系統架構演進試驗計劃）聯合提交業內首個LTE TDD互通性測試報告。應科院又將TD-LTE的UE模擬器授權予一家頂尖無線測試設備供應商來開發LTE測試設備。

應科院多次獲邀與創毅視訊、安捷倫、羅德與施瓦茨、picoChip、摩托羅拉及中興通訊，在主要的國際性會議與展覽會，展示多天線TD-LTE技術，發送無線高清視訊，包括二零零九年巴塞隆拿世界移動通訊大會、二零零九年及二零一零年拉斯維加斯無線通訊展及二零零九年日內瓦世界電訊展。

Engineer optimizing parameters of RF Tuner Chip for digital TV reception
研發工程師正在優化設定數碼電視調諧器晶片內的參數

In view of the huge market potential for LTE on the Mainland and global markets, a solid and competitive foundation to play a leading role in future has been established.

The Mobile WiMAX BTS Core supporting IEEE 802.16e standard and the WiMAX ASN-GateWay were transferred to a Hong Kong-based leading wireless equipment company to strengthen its broadband wireless system design capabilities.

Meanwhile, the CWMS was commercialized and installed in more than 20 networks in Hong Kong, the Mainland, the U.S., Cambodia, Malaysia and New Zealand. In Hong Kong, it has been installed in more than 10 schools including Pui Ching College, Hong Kong Wah Yan College, Shatin College and Saint Peter's College. It will be deployed in 10 more schools in the near future. Also, CWMS is being enhanced to manage multiple-vendor wired networks supporting advanced Internet Protocol services, as well as being commercialized with several potential customers.

Digital Terrestrial and Mobile TV

The system design of the DTMB receiver baseband was transferred to a leading semiconductor company on the Mainland because it has a more superior chip than those in the market. Based on its experience, which has benefited DTMB deployment in Hong Kong, the team is working with several partners to improve DTMB deployment.

However, DTMB deployment faces some technical challenges such as SFN coverage design and pre/post-echo mitigation. Conformance certification tests are being carried out, and if successful, will facilitate DTMB deployment in Hong Kong and the Mainland.

上述成果奠定了應科院發展LTE技術的基礎，在未來內地及全球龐大的LTE市場中保持堅實的競爭力。

符合IEEE 802.16e標準的移動WiMAX基站核心技術與WiMAX接入網網關平台技術已授權給本地一家領先無線設備公司，以加強其寬頻無線系統的設計能力。

可定制無線網絡管理系統（CWMS）已成功產業化，超過二十個網絡已佈建在世界各地，包括香港、中國內地、美國、柬埔寨、馬來西亞和紐西蘭。本港超過十間學校，包括培正學院、香港華仁書院、沙田英童中學及聖彼德書院等，已安裝了該系統。另有十所學校將會在不久將來佈建該系統。此外，CWMS也正在逐漸改良中，用以管理不同供應商的有線網絡，支援先進的互聯網絡協議服務。應科院與幾家客戶在洽談中，準備將此技術產業化。

數碼地面與移動電視

DTMB接收機基帶晶片的系統設計，由於其設計與性能比市場上其他晶片優越，已成功轉移給內地一家領先的無線通訊晶片廠商。技術團隊以其專業知識，正與幾個夥伴合作，提高DTMB在本地的佈建。

然而DTMB的佈建面對一些技術挑戰，如單頻網佈建涵蓋範圍規劃及降低前/後迴音。技術團隊現正進行一致性認證測試，如能解決上述問題，將有利DTMB在香港和內地的佈建。

Income from industry during the year amounted to
本年度的業界收入總額為

$13.9
million (HK$)
百萬(港元)

RF Transceiver

Following transfer of the CWPAN/Zigbee RF Transceiver to Vinno, the R&D team licensed the Multi-mode Mobile TV RF Tuner to a major semiconductor enterprise on the Mainland. The former case effectively supported the customer in playing a leading role in promoting sensor network on the Mainland, which is strongly endorsed by the Beijing Municipal Government. The latter design was well received by the customer who processed it for integration and commercialization. The potential market share is quite promising in view of Mainland and global demands.

Antenna and Digital-RF

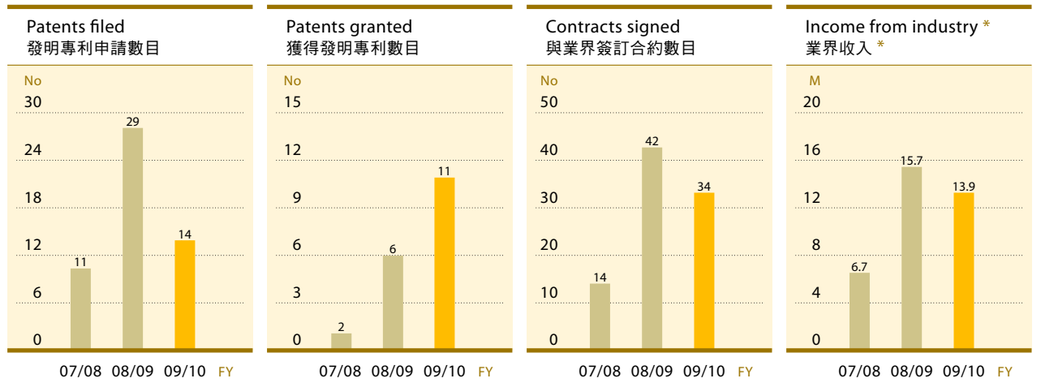
The Antenna and Digital-RF team has been offering various antenna designs for WiFi USB dongle with MIMO, portable digital TV device, mobile phone and accessories, wireless charger, RF jamming for road toll and wireless base station as well as consultant testing services to local industry. Two examples of commercial products being sold in the market are iPhone 3G/3GS wireless charger commercialized by a Hong Kong-based company and Auto-Finder products developed by a U.S. company. Meanwhile, the team is using innovative antenna and RF technology to improve accuracy and minimize erroneous charging of toll collections.

射頻收發器

隨著雙模CWPAN/ZigBee射頻收發器晶片轉移給威訊紫晶，該技術團隊接著將多模移動電視調諧器晶片授權給內地一家主要的半導體企業。前者有效地協助客戶在內地領先推廣傳感器網絡，此舉得到北京市政府的大力支持。而後者的設計獲客戶完全接納，並進行產品整合及商品化。鑑於內地與全球需求，潛在的市場份額相當龐大。

天線與數碼射頻設計

天線與數碼射頻技術團隊為業界提供天線設計與服務，包括多天線WiFi USB數據卡、數碼移動電視裝置、手機與配件、無線充電器、道路自動收費系統射頻幹擾器、無線基站及顧問測試服務。已推出市場銷售的成功例子有兩個：一家本地公司推出的iPhone 3G/3GS無線充電器，及一家美國公司推出的自動搜尋裝置。此外，技術團隊使用創新的天線與射頻技術，來改良道路自動收費系統的精準度，以減少錯誤收費。



No number 數目 M million (HK$) 百萬(港元) FY fiscal year 財政年度
* received cash and in-kind 實收現金和物資資助

WiMAX Access Service Network Gateway
WiMAX接入服務網網關

A portable WiMAX terminal device can be used for mobile video surveillance and real time live video streaming
利用便攜式WiMAX接入終端，可以進行移動視頻監控及視頻直播

Project Highlights 重點研發項目

F Full Project 正式項目
S Seed Project 種子項目

	Project 項目	Description 內容	Duration 時期
F 1	Mobile WiMAX BTS Technology Platform 移動WiMAX基站技術平台	Develop Mobile WiMAX BTS platform supporting IEEE 802.16e standard and WiMAX Wave 2 MIMO. It is a scalable and cost effective design. 開發符合IEEE 802.16e標準及WiMAX Wave 2 MIMO的移動WiMAX基站平台，具成本效益及可伸縮設計。	Jun 2008 to Nov 2009 二零零八年六月至 二零零九年十一月
S 2	4th Generation IEEE802.16m Technology Platform 第四代IEEE 802.16m技術平台	Feasibility study of a 4th generation broadband wireless access technology platform based on IEEE802.16m technologies including digital IF, baseband, hardware, firmware and RF. 開發基於第四代IEEE802.16m寬帶無線接入技術平台的可行性研究，包括數碼IF、基帶、硬件、固件及射頻。	Dec 2009 to May 2010 二零零九年十二月至 二零一零年五月
S F 3	WiMAX Access Service Network Gateway (ASN-GW) Platform WiMAX接入網網關平台	Develop a mobile WiMAX ASN-Gateway platform including basic data, control and management modules to coordinate functions such as mobility handover, data path, paging, authorization (QoS, user) among different BTSs. The ASN-GW platform can be rapidly customized to • support multi-vendor or model BTSs; and • support Hybrid Radio Resource Control (RRC) for enhancing performance. 開發WiMAX接入網網關，包括基本數據，負責控制和協調移動交接的管理模塊、數據路徑、傳呼、QoS的授權和基站間的用戶認證。本接入網網關平台可以快速客制化以支援 • 多廠商/模式基站 • 混合無線資源控制架構以加強區域參考中心的性能。	Feb 2008 to Jan 2010 二零零八年二月至 二零一零年一月
F 4	Wireless Network Edge Solution 無線接入網方案	Address compact, low-cost, enterprise grade WiMAX ASN-GW, supporting 1U hardware platform, small scale network deployment. Enhance and integrate Customizable Wireless Management System to provide total management solution for WiMAX ASN-GW and BTS. 開發小巧、低成本、企業級的接入網網關(ASN-GW)，支持1U硬體平台及小規模部署。同時加強及整合可定制無線網絡管理系統(CWMS)功能，為WiMAX接入網網關及基站技術提供完整的管理方案。	Jan 2010 to Apr 2011 二零一零年一月至 二零一一年四月
F 5	ASTRI-Tsinghua University MBC Joint Lab–Foundation Platform Technologies 應科院－清華大學多媒體廣播與通訊聯合研究實驗室基礎平台技術	• DTMB receiver testing and verification methodology, software and environment; • DTMB transmit spatial diversity scheme and a system; • BWM spectrum management and deployment strategy. • 發展DTMB相關標準和認證方法、軟件及環境； • 開發DTMB創新的發射端空間分集技術及系統； • 研究中國寬頻無線多媒體(BWM)網路的頻譜資源管理及部署方法。	Jan 2008 to Dec 2010 二零零八年一月至 二零一零年十二月
F 6	ASTRI-Tsinghua University MBC Joint Lab—DTMB Instrumentation and Testing Platform 應科院－清華大學多媒體廣播與通訊聯合研究實驗室DTMB測試技術平台	Develop DTMB measurement and analysis tools for building test equipment; software tools for measuring and displaying DTMB signal in field, post processing and analysis software package. 本項目開發供建立測試設備所用的DTMB測量分析工具；場地測量及演示DTMB訊號的軟件工具；後處理分析軟件包。	Jun 2008 to May 2009 二零零八年六月至 二零零九年五月
F 7	OFDM Core for Digital TV Applications OFDM核數碼電視應用	Develop a DTMB receiver baseband chip design, including architecture, algorithms, function blocks, test bench, hardware realization and test chip. Such development establishes the core technology foundation and leads to chip development. 開發DTMB接收器基帶晶片，包括系統架構、演算法、功能模組、測試平台、硬體實現和測試晶片等。目的是建立核心技術基礎，從而開發晶片。	Oct 2007 to Apr 2009 二零零七年十月至 二零零九年四月
F 8	Dual-mode Digital TV Receiver Chip and Reference Design 雙模數碼電視接收晶片及參考設計	Develop a Digital TV receiver baseband core, IPs and ASIC design with both single carrier and multi-carrier functionalities compliant with Mainland DTMB standard. 開發適用於中國強制數字地面電視標準(DTMB)的單頻和多頻模式的數碼電視接收基帶核心、知識產權及ASIC設計。	Jun 2009 to Dec 2010 二零零九年六月至 二零一零年十二月
F 9	Multi-mode Mobile TV Baseband Demodulator 多模式移動電視基帶解調器	Develop a multi-mode mobile TV baseband demodulator supporting CMMB (Mainland), DVB-H (Korea, Europe) and T-DMB (Europe). It fully utilizes common building blocks of three OFDM-based technologies to deliver a low-power, small silicon area and cost-effective solution. 開發適用於多模式移動電視的基帶解調器晶片技術，支援CMMB(中國)、DVB-H(韓國、歐洲)及T-DMB(歐洲)等多項標準。並且充分利用這些均以OFDM為基礎的標準／技術中的可共用模塊的特性，來發展低功耗、小面積及價格低廉的解決方案。	Jul 2008 to May 2010 二零零八年七月至 二零一零年五月
F 10	Practical MIMO for WiMAX/LTE device WiMAX/LTE裝置上的實用多輸入多輸出技術	On top of the technologies built for Practical MIMO for indoor WiFi terminal device, this project focuses on the design of Practical MIMO and baseband core technologies for 3GPP TD-LTE terminal device, which is at an early stage globally and on which ASTRI has great opportunities to play important roles. 基於室內多天線無線終端設備實用多天線技術，這個項目的重點是設計用於3GPP的TD-LTE終端設備的實用MIMO和基帶核心技術。該技術在全球仍處於早期階段，應科院有很大機會發揮其主導角色。	Jun 2008 to Dec 2009 二零零八年六月至 二零零九年十二月

F Full Project 正式項目
S Seed Project 種子項目

	Project 項目	Description 內容	Duration 時期
F 11	TD-LTE Femto BTS Baseband Core TD-LTE家庭基站基帶處理內核	TD-LTE is an evolution technology for 3GPP (TD-SCDMA and WCDMA). This project is to develop and implement a world leading baseband core for TD-LTE Femto BTS with full function. TD-LTE是3GPP（TD-SCDMA及WCDMA）的演進技術。本項目的目標是開發及實現世界領先的全功能TD-LTE家庭基站基帶處理內核。	Jun 2009 to Dec 2010 二零零九年六月至 二零一零年十二月
F 12	TD-LTE Terminal Baseband Core TD-LTE終端基帶內核	Develop and implement a high performance terminal baseband core which can support up-to-date TD-LTE 3GPP specifications. It will also be tested against TD-LTE base stations from tier-one wireless infrastructure providers. 開發及實現高性能的終端基帶內核以支持最新的TD-LTE 3GPP規格，並與世界領先的無線系統供應商的TD-LTE基站進行互通性測試。	Nov 2009 to May 2011 二零零九年十一月至 二零一一年五月
F 13	RF Design for WPAN Core Technology Platform 基於無線個域網核心技術平台的超寬頻射頻設計	Develop WiMedia MB-OFDM based UWB RFIC design, IP and solutions. Research efforts focus on the creation of reusable architecture, hardware IP blocks, test software and product development kits. 基於WiMedia MB-OFDM無線超寬頻標準，同時考慮中國未來的UWB規範，開發先進的射頻集成電路設計、知識產權和解決方案。主要設計可複用的系統結構、硬體IP塊、測試軟體以及產品開發包等。	Nov 2007 to May 2009 二零零七年十一月至 二零零九年五月
F 14	Next Generation Antenna Sub-assemblies 新一代天線組裝配件	Develop platform technology for new intelligent antenna sub-assemblies which can be applied to: • Multi-band/mode and miniature antenna sub-assemblies for new wireless devices; • Beam-forming antenna sub-assemblies at low cost while increasing the system's range; and • MIMO antenna sub-assemblies for high data rate applications. 開發新型的天線整合組裝設計技術平台，適用於： • 新型無線設備的多波段／模式和微型天線整合組裝設計； • 波束天線整合組裝設計具低成本、增加系統傳輸距離等優點； • 多天線整合組裝設計技術及其在高數據率中的應用。	Feb 2008 to Jul 2009 二零零八年二月至 二零零九年七月
F 15	Near-field Antenna Sub-assemblies 近場天線組裝配件	Develop low-cost, high performance antenna coil arrays and multi-band antenna coils, beam-forming and isolation technologies for value-added applications. A key application is medical imaging, particularly in providing high resolution MRI machines at low cost. 開發低成本、高性能、高增值應用的天線線圈陣列和多波段天線線圈、波束和隔離技術。其中一個主要應用是醫學成像，特別為低成本磁共振成像儀提供高解析度圖像。	Sep 2009 to Mar 2011 二零零九年九月至 二零一一年三月
F 16	Dual-mode CWPAN/Zigbee RFIC Transceiver CWPAN/Zigbee雙模射頻收發器晶片	Develop dual-mode RFIC transceiver to support low-rate Chinese WPAN standard at 780 MHz and international Zigbee standard at 868/915 MHz. The development includes module design (LNA, PA, mixer, VCO, PLL, VGA and ADC/DAC) and transceiver integration. The transceiver adopts direct conversion architecture to save power and reduce size with advanced DC offset cancellation techniques. The 0.18μm RF CMOS technology is used to implement the transceiver. 開發雙模射頻收發器晶片，支援低速率780MHz的中國無線個域網（CWPAN）標準，以及868/915MHz的國際Zigbee標準。項目重點含多個獨立模組的設計和整個收發器的集成。主要模組包括LNA、PA、mixer、VCO、PLL、VGA及ADC/ DAC。射頻收發器採用零中頻的架構以節省功耗和縮小面積，並採用先進的直流偏移取消技術。製造工藝採用0.18μm RF CMOS。	Jan 2008 to May 2009 二零零八年一月至 二零零九年五月
F 17	Reconfigurable Multi-mode Digital TV RF Tuner 可重置多模數碼電視射頻調諧器	Develop multimode RFIC tuner to support CMMB, DVB-H, DMB-H and T-DMB standards for mobile applications. This tuner covers three bands: VHF, UHF and S-band. Advanced direct conversion architecture is adopted to save power and reduce size. I2C is used as serial interface with baseband. Dedicated gain control and time-slicing control are included. The tuner is fabricated in 0.13μm RF CMOS technology. 本項目開發的多模數碼電視射頻調諧器，可支援CMMB、DVB-H、DMB-H和T-DMB等四個標準。該調諧器覆蓋VHF、UHF和S波段三個頻段。採用零中頻直接轉換架構，來節省功耗和縮小面積。與基帶之間的串行接口為I2C，並包含增益控制及時隙控制。製造工藝採用0.13μm RF CMOS。	Mar 2009 to Sep 2010 二零零九年三月至 二零一零年九月

myID e-Book
myID 電子書

An e-Book using ASTRI's technology opens Hong Kong to a new era of e-learning education
以應科院技術開發的電子書為香港教育界開創一個全新的電子學習年代

Reports of R&D Groups and Subsidiary
研發群組及附屬機構報告

Enterprise & Consumer Electronics Group
企業與消費電子群組

The mission of the Enterprise & Consumer Electronics Group is to create and expand Hong Kong's core intellectual property for multimedia and develop networked consumer electronics and applications.
企業與消費電子群組的使命是在多媒體方面創造和擴展香港的核心技術知識產權，開發網絡互聯的消費電子產品及應用。

The mission of the Enterprise & Consumer Electronics (ECE) Group is to create and expand Hong Kong's core intellectual property for multimedia and develop networked consumer electronics and applications. These dedicated efforts will enhance competitiveness of local industries, help them move up the value chain and capture future job and business growth opportunities presented by the newly emerging worldwide wireless and multimedia consumer market.

The Group has four major ongoing programmes: Digital Home Technology (DHT), Mobile Multimedia Communications Technology (MMCT), Multimedia Technology IP (MTI) and Pervasive Service Technology (PST). Each programme offers a suite of licensable products and platforms. In addition, ECE has the Digital Living Consortium as its marketing arm with active participation and support from industry.

企業與消費電子群組的使命是在多媒體方面創造和擴展香港的核心技術知識產權，開發網絡互聯的消費電子產品及應用，藉此加強本地業界的競爭能力，幫助產業向價值鏈上游轉移，把握全球無線及多媒體消費新興市場所帶來的就業機會和商機。

企業與消費電子群組有四個主要的技術發展領域：數碼家庭技術、移動多媒體通訊技術、多媒體技術知識產權和普及服務技術。每個技術發展領域都提供整套可授權予產業的產品及平台。企業與消費電子群組還設立了數碼生活聯盟以開拓市場，並得到業界的積極參與和支持。

Review 回顧

DHT developed High Definition Set-top Box (HD STB) platform (supporting DVB-T, DMB-T/H and IP connection) along with interactive TV and Man Machine Interface (MMI) technologies. Its HD STB with interactive TV technology was commercially launched as the world's first all-in-one HD STB/PVR. The product won two major awards in Hong Kong with very positive market feedback. Also, the MMI technology developed gave rise to the development of the world's first motion enabled next-generation remote controller for HD TV with compatible price and power consumption.

In addition to the HD STB, DHT developed the Broadcast Encryption Digital Right Management (BE DRM) platform for Internet video delivery over PC and embedded devices through client/server, Content Deliver Network (CDN) and P2P network delivery mechanism. It is critical the DRM solution meets the scalability and flexibility of P2P delivery requirement, which all existing client-server based DRM with Public Key Infrastructure (PKI) architecture fail to address. The platform has been adopted by a major telecom operator on the Mainland for delivering high quality streaming TV and on-demand video to broadband users' home via Internet. To extend the platform, DHT developed the BE engine for mobile devices with small footprint and optimized execution, meeting the requirements of 3G and mobile Internet applications.

數碼家庭技術組開發了高清機頂盒平台(支持DVB–T、DMB–T/H和網絡連接)以及互動電視和人機界面技術。其高清機頂盒與互動電視技術已經投入商用市場，成為全球第一台集全功能於一身的高清機頂盒/個人視頻錄像機，此產品除了在香港獲得非常積極的市場反饋，還贏得了兩個重要獎項。此外，該組利用人機界面技術，開發了世界第一個能以動作操控的新一代高清電視機遙控器，在價格和功耗上都具有競爭力。

除了高清機頂盒外，數碼家庭技術組還開發了廣播加密數碼版權管理(BE　DRM)平台，該平台適用於個人電腦和嵌入式設備，通過客戶端設備/伺服器、內容交付網絡和點對點網絡傳輸機制來進行互聯網視頻傳輸。該廣播加密數碼版權管理系統符合點對點傳輸的可升級和靈活性等要求，這點非常關鍵，因為所有現有具公鑰基礎設施(PKI)的以客戶端－伺服器為架構的數碼版權管理系統都不能達到這些要求。該平台已經獲中國內地一家主要的電訊營運商採用，通過互聯網向寬頻家庭用戶傳輸高品質的流媒體電視和視頻點播。數碼家庭技術組還從該平台延伸，開發了用於移動終端設備的廣播加密引擎，具有更小的存儲空間及優化的執行速度，滿足3G和移動互聯網應用的要求。

01

02

01 Computer as e-Reader
電腦作為電子閱讀器

02 Mobile Internet Device
移動互聯網設備

Set-top Box User Interface
機頂盒用戶界面

DHT also ventured into the intelligent surveillance arena and developed a streaming technology platform for multiple channels high definition TV wall system via an ICP project. The HD TV wall system has been deployed in several government and enterprise sites. It has also developed an intelligent trans-coding technology for the 3G network and made good progress in researching and developing intelligent surveillance algorithms enabling automatic detection of impulsive sounds and video events.

MMCT developed the web 2.0 enabled mobile Internet device technology platform, mobile P2P networking technology for peer group formation and management and innovative MMI for mobiles based on various sensing technologies such as image, motion and touch. These technologies provide a complete hardware and software platform for customers to develop their own production or solution. In 2009, MMCT basing on these technologies developed and deployed the first e-Learning device in Hong Kong. Further extending the platform, a prototype of dual screen e-Book with e-ink display on one side was also developed and demonstrated at CES 2010 in the U.S.

數碼家庭技術組也在智能監控方面，進行了新的研發，透過一項業界合作項目，開發了支援多頻道高清電視牆系統的流媒體技術平台，該系統已經部署在中國內地多個政府機構和企業單位。數碼家庭技術組同時也開發了一個智能轉碼平台供3G網絡使用，在智能聲音檢測和視頻分析算法的研發上取得良好的進展，對衝擊型聲音和視頻事件能進行自動檢測。

移動多媒體通訊技術組開發了能夠支援web 2.0的移動互聯設備技術平台、組成和管理對等網組的移動點對點網絡技術，以及以不同傳感技術，如圖像、位移和觸摸為基礎的移動設備而設計的創新性人機界面。這些技術為客戶提供了一個完整的硬件及軟件平台，用以開發他們自己的產品和解決方案。移動多媒體通訊技術組於二零零九年採用這些技術開發了香港第一台電子書設備，並於二零一零年把平台進一步延伸，在美國國際消費電子展上演示了新一代雙屏電子書原型，該電子書其中一個屏幕為電子墨水屏幕。

01 Mobile device as e-Reader
移動設備作為電子閱讀器

02 Large screen e-Reader
大屏幕電子閱讀器

MTI also achieved significant SoC milestones developing Hong Kong's first H.264 Full-HD 1080P Video Decoder IC, as well as the China-Standard AVS Full-HD 1080P Video Decoder IC. In addition, MTI developed a highly integrated multi-format audio control and playback SoC, incorporating the ASTRI Audio Processing Engine IP. This SoC is now fully commercialized and the customer has deployed this mass-produced SoC (OTK-5256) in its designs of audio products for major tier-one consumer electronics customers.

PST has been developing enabling software technologies for networked consumer electronics, focusing on accessibility, interoperability, usability and manageability. During the fiscal year, it applied expertise in system management and control to build a software technology platform for sensor-based applications, developing two applications for environmental protection, an application on water purification and another on efficient power quality measurement and analysis.

ECE filed 26 and was granted three patents regarding its core technologies and signed 19 industrial contracts for technology dissemination amounting to about $12 million in received cash and in-kind during the year.

多媒體技術知識產權組已在系統晶片的研發上屢次取得重要成果，成功開發了香港首個H.264全高清1080P的視頻解碼器集成電路，及中國標準AVS的全高清1080P視頻解碼器集成電路。同時，多媒體技術知識產權組結合應科院音頻處理引擎IP，開發了高度集成的多制式音頻控制和可播放的系統晶片，並已完全商業化，客戶採用此大規模生產的系統晶片(OTK-5256)，為高檔消費電子產品顧客設計音響產品。

普及服務技術組針對網絡化的消費電子，開發軟體平台技術，主要集中於「可近性」、「可交互性」、「可使用性」和「可管理性」等幾個方面。該組在本年度應用系統管理和控制的專業經驗，建立了一個感應器應用軟件技術平台，並開發了兩項環保應用軟件：其一為水質淨化系統，另一項是高效率電能質量測量及分析。

企業與消費電子群組於本年度就其核心技術作出二十六項專利申請，並取得三項專利；與業界簽署十九份技術轉讓合約，取得現金和物資資助總額約共一千二百萬元。

During the year, a total of
本年度企業與消費電子群組
共申請了

26

patents were
filed by ECE Group
項發明專利

Dual-screen e-Book
雙屏電子書

A novel designed dual-screen e-Book reader that easily fits into hand is ideal for content sharing and interactive learning
設計新穎的雙屏電子書，外型輕巧方便，是最佳的內容分享和互動學習工具

Developments 發展

ECE made significant efforts to help customers use its technology platforms for developing innovative and competitive products in pursuing business and market opportunities worldwide. Listed below are some of its products available in different markets.

企業與消費電子群組致力協助客戶利用其技術平台，開發創新和富競爭力的產品，把握商機開拓全球市場。下列是群組在各地市場提供的科技產品。

HD Set-top Box (STB) /Personal Video Recorder (PVR) 高清機頂盒/個人視頻錄像機	The Mainland, Hong Kong and Macau 中國內地、香港及澳門
e-Book for e-Learning Device 支持電子學習的電子書	Hong Kong and Macau 香港及澳門
Home Media Centre 家庭媒體中心	The Mainland, Taiwan, Korea and Europe 中國內地、台灣、韓國及歐洲
TV Wall 電視牆	The Mainland 中國內地
Real Time Surveillance (RTS) 實時監控系統	The Mainland 中國內地
Multimedia Audio Chip 多媒體音頻晶片	Worldwide 全世界
Multi-channel Voice Processing Board for Cellular Network 多通道語音模塊網絡測試系統	The Mainland 中國內地

Digital Home Technology (DHT)

DHT will continue developing innovative technologies with commercial value in the following areas:

- MMI technology for digital home to enable the trend of convergence of three networks, namely broadcasting, Internet and telephone;
- Android technology platform for digital home to further enhance Android framework with HD extension providing cohesive user experience across three different screens, namely TV, PC and smart phone, as well as establishing an Android Alliance to form a standard open source forum for Android OS to benefit local industry in a much bigger scale; and
- porting of the award winning HD STB/PVR software to low-cost HD SoC.

數碼家庭技術

數碼家庭技術組將繼續發展包括以下幾個具有商業價值的創新技術：

- 人機界面數碼家庭技術，以促進三網(廣播、互聯網和電話)融合的趨勢；
- 為數碼家庭而發展Android技術平台，以高清數字電視延伸格式進一步提升Android框架，提供三個不同屏幕(電視機、個人電腦和智能手機)凝聚一體的用戶體驗，並建立一個Android聯盟，形成一個Android操作系統的標準開源論壇，為本地產業創造更大的利益；
- 移植獲獎的高清機頂盒/個人視頻錄像機軟件至低成本高清系統晶片。

Conference Phone
會議電話

Digizon products with ECE technology inside
以企業與消費電子群組技術開發的Digizon產品系列

In addition, DHT will continue developing innovative home media and networking technologies targeting the secure and efficient media delivery over the Internet. With the extensive reach of broadband and mobile 3G networks, more multimedia content will be accessed and delivered to consumers in various applications. DHT will focus on technologies enabling new applications with the innovative P2P media delivery, securing content protection under all delivery mechanism, and guaranteeing end-users quality of experience. These technologies are indispensable tools for service and content providers in rolling out new multimedia services and applications over the Internet.

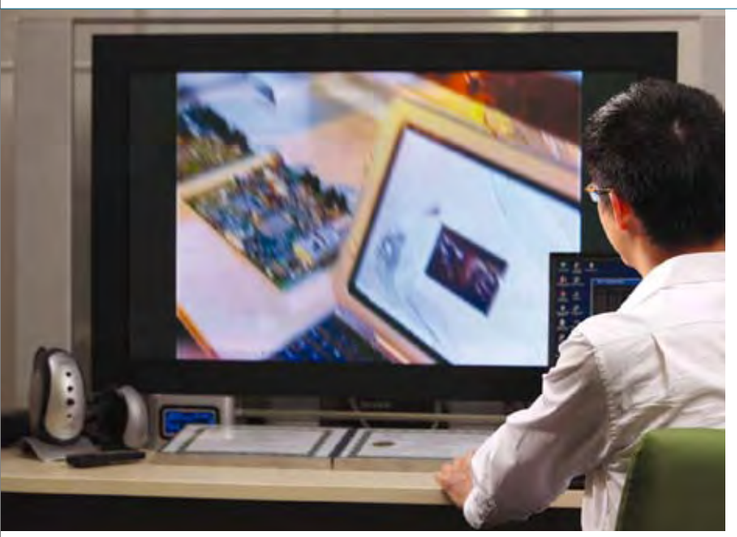
Furthermore, Digital Right Management (DRM) technology will be extended to support a new application area - e-Publishing. In the e-Publishing environment, it must have a digital framework storing rights information about assets and an access management system ensuring only authorized users have access to assets, administering licensed digital contents for internal use by business partners, providing mechanisms to obtain rights or process royalties and enabling asset packaging for use by multiple parties.

In the new area of intelligent surveillance applications, DHT will develop core multimedia information processing technology platform enabling automatic machine processing to achieve better content understanding and rendering, scene analyses, event detections, presentations and enhancements.

此外，數碼家庭技術組還將針對安全和有效的互聯網媒體傳輸，繼續開發創新的家庭媒體和網絡技術。隨著寬頻和移動3G網路的廣泛使用，消費者通過各種應用接收和發放愈來愈多的多媒體內容。數碼家庭技術組專注發展的技術，將以創新的點對點媒體傳輸來促成新的應用，在所有傳輸機制下保障內容得到保護，及保證終端使用者的體驗質量。這些技術是服務及內容供應商在互聯網上推出新的多媒體服務和應用不可缺少的工具。

數碼版權管理技術將延伸以支援新的應用領域—電子出版。在電子出版環境中，必須有一個數碼框架來儲存關於資產的權利資訊，並有管理進入的系統，以確保只有授權用家才能涉足資產，管理授權數碼內容讓合作夥伴內部使用，提供機制以取得授權或處理版稅，和促成資產包裝組合供多方使用。

在智能監控應用這新領域方面，數碼家庭技術組將研發核心多媒體信息處理技術平台，以支援計算機自動信息處理，使內容得到更好的理解和展示，並支援視頻場景分析、事件監測、信息表達和強化。



ECE Demo Lab
企業與消費電子群組演示實驗室

Mobile Multimedia Communications Technology (MMCT)

MMCT will continue developing innovative Man Machine Interface (MMI) for mobiles based on image sensing technologies. MMCT started working on e-Learning and content searching in 2009, and will further expand with new developments including next generation e-Book for e-Learning, virtual directory technology for content sharing and personal content web search engine. MMCT will further build up know-how on Android OS. All the newly developing technologies will be run on Android OS, making our technologies broadly used in different Android based products.

Multimedia Technology IP (MTI)

MTI has been focusing on developing the most cost-effective and higher performance Set-Top box (STB) SoC, a total solution including a reference design board and a Graphic User Interface Software Development Kit. In addition to the current 0.13µm CMOS technology STB SoC development, MTI will continue to further develop the 65nm CMOS technology multimedia platform SoC for the next generation consumer electronics products. This enables ASTRI to successfully engage with customers in developing full commercial grade multimedia SoC products.

移動多媒體通訊技術

移動多媒體通訊技術組將繼續利用圖像傳感器技術開發用於移動設備的創新人機界面。移動多媒體通訊技術組於二零零九年開始研發電子學習和內容搜索，並將進一步擴展，開發新項目，包括為電子學習開發新一代電子書、為支援內容分享開發虛擬目錄技術，及開發個人內容網絡搜索引擎等。該組也進一步積累Android操作系統的專業知識，所有新研發的技術將在Android操作系統上執行，使技術能夠廣泛地應用在不同的Android產品上。

多媒體技術知識產權

多媒體技術知識產權領域一直致力於發展最具成本效益，以及更高性能的機頂盒系統級晶片，其整體解決方案包括參考設計板及圖形用戶界面軟件開發工具包。除了目前的0.13微米CMOS技術機頂盒系統級晶片開發，多媒體技術知識產權組將繼續開發為新一代消費電子產品應用的65納米CMOS技術多媒體平台系統級晶片，使應科院在開發具商業價值的多媒體系統級晶片產品上，成功取得客戶。

除了機頂盒系統級晶片外，多媒體技術知識產權組也將著重研發高清晰度電視技術的視頻後處理。這項技術知識產權的主要特點包括最先進的圖像處理技術，如幀速率轉換、圖像降噪、色彩和清晰度、及其它圖像增強處理，使應科院能開發自主數碼電視平台，大大的提高視頻質量，同時為香港和中國內地的電視製造商提供一個具成本效益的全功能數碼電視系統級晶片解決方案。

01

02

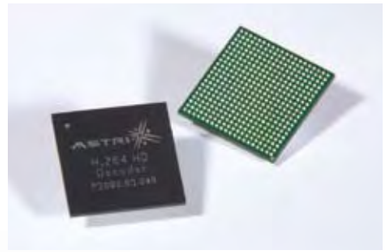
In addition to the STB SoC, MTI will focus on Video Post Processing. The main features of this IP include the latest state-of-the-art image processing techniques such as Frame Rate Conversion, Image De-Noising, Colour and Sharpness and other image enhancement processing. This enables ASTRI to develop its own digital TV platform which will significantly improve the subjective video quality and at the same time provide a cost-effective full feature digital TV SoC solution for Hong Kong and Mainland TV manufacturers.

In the emerging 3DTV area, MTI teamed up with five tier-one universities in Hong Kong, Taiwan and the Mainland to develop essential technologies applicable for 3DTV applications, especially for 3D content creation and 3D content distribution. These technologies will be integrated into a unified research platform. The IP generated during research will empower industries in the region to compete in the 3D market.

Pervasive Service Technology (PST)

Leveraging PST's server side software platform technology, PST will work with MMCT in developing Learning Management System (LMS) for primary schools in Hong Kong to facilitate e-Learning. To complement e-Book/e-Learning initiatives, PST will develop e-Publishing software to enhance publishers' roles in the value chain.

03



H.264 Chip
H.264晶片

普及服務技術

普及服務技術組將利用伺服器軟件平台技術，與移動多媒體通訊技術組合作開發教學管理系統(LMS)，並應用於香港的小學，以促進電子學習。為配合電子教科書及電子學習的發展，技術組亦將研發電子印刷軟件，提升印刷商在電子教學價值鏈的地位。

01 Electronic Program Guide on mobile device
移動設備上的電子節目菜單

02 Dual-tuner HD Set-top Box/PVR
雙高清機頂盒/個人視頻錄像機

03 Mobile TV User Interface on iPhone
iPhone上的移動電視用戶界面

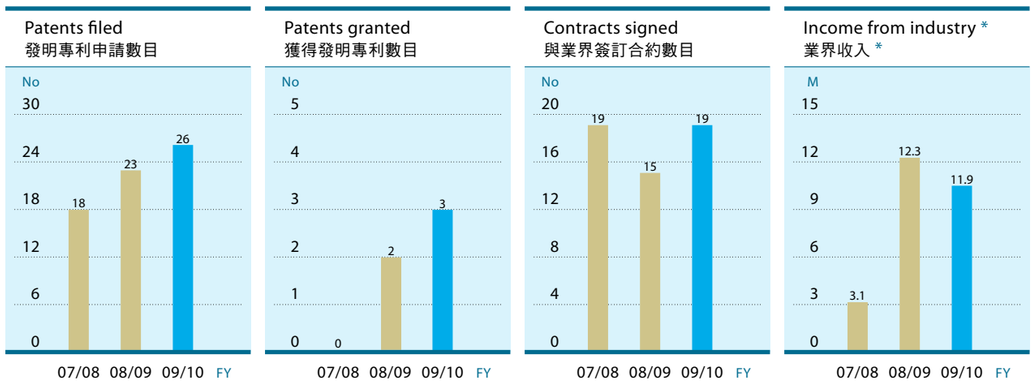
Achievements 成果

Income from industry during the year amounted to
本年度的業界收入總額為

$11.9
million (HK$)
百萬(港元)

Since launching the R&D Centre for ICT in 2006, ECE has signed more than 65 industrial contracts for disseminating technologies with a value totalling nearly $54 million as at 31 March, 2010. The licensees include companies in Hong Kong, Taiwan, the Mainland, Korea and Australia. ECE has filed about 80 patents during the period, with five granted in the U.S./ Mainland. Below is a summary of patents filed/granted, technology transfers and income from industry received in the past three years.

自香港資訊及通訊技術研發中心於二零零六年成立以來，企業與消費電子群組與業界簽訂合約超過六十五份以進行技術轉移，截至二零一零年三月三十一日，總合約金額接近五千四百萬元。獲技術授權的公司來自香港、台灣、中國內地、韓國和澳洲。群組於此期間申請的發明專利約八十項，其中五項在美國／中國內地已成功獲批。企業與消費電子群組在過去三年申請／獲得的發明專利數目、與業界簽訂合約數目，及從業界取得現金和物資總額表列如下。



No number 數目 M million (HK$) 百萬(港元) FY fiscal year 財政年度
* received cash and in-kind 實收現金和物資資助

Media Streaming Technology 流媒體技術

ECE's media streaming technology enables streaming of TV content to personal mobile device for users' enjoyment of real time TV programmes
企業與消費電子群組開發的流媒體技術可將電視內容串流到個人化的移動裝置上，讓使用者可以享受實時電視廣播

First All-in-One HD STB/PVR

DHT partnered with Eight Limited to launch the world's first all-in-one HD STB/PVR-NOVA in Hong Kong, Macau and the Mainland markets.

NOVA wins double acclaim including AV Magazine 2009 Best Set-top Box Award and HDAV Magazine Best of HDTV Recorder 2009
NOVA獲AV雜誌2009年「機頂盒年度之選」及HDAV雜誌2009年「最佳高清電視錄影機獎」兩項美譽

BE DRM & Managed P2P on Trial by Telecom Operators

DHT's BE DRM technology is the only DRM platform achieved in the market that meets media requirements of large scale P2P networks. Together with the Managed P2P Media Delivery platform, the new BE DRM technology has been adopted in Hong Kong and Mainland markets. The core technologies of these platforms are developed through the ITC projects BE DRM and Managed P2P. DHT also supported existing home media technology customers in rolling out new services and applications in the mobile 3G and WiMAX market in Taiwan. In addition, it also signed up three telecom operators interested in pilot trials of the mobile streaming technologies.

Surveillance Technologies Deployment on the Mainland

In the area of surveillance, DHT's TV wall system has been deployed in several government and enterprise sites, while the trans-coder and real time iPhone have passed field trials of China Unicom's 3G network for enterprise surveillance service. Meanwhile, the customer is integrating ASTRI's video de-noising technology into its video surveillance products.

首台集全功能於一身的高清機頂盒/個人視頻錄像機

數碼家庭技術組與Eight Limited合作在香港、澳門及內地市場推出全球首台集全功能於一身的高清機頂盒/個人視頻錄像機NOVA。

電訊運營商試行廣播加密數碼版權管理及可管理點對點媒體傳輸

數碼家庭技術組的廣播加密數碼版權管理技術是市場上唯一達到大規模點對點網絡媒體傳輸要求的技術。新型廣播加密數碼版權管理技術及可管理點對點傳輸平台已投入香港和內地市場。這些平台的核心技術是在創新科技署專案支援下開發出來的。數碼家庭技術組還支援現有家庭媒體技術客戶在台灣移動3G和WiMAX市場推出新業務和應用，並與內地三家電訊營運商簽約，試運行移動流媒體技術。

在內地部署智能監控技術

在智能監控方面，數碼家庭技術組研發的高清電視牆系統已在內地多個政府機構和企業佈建，而為企業監控服務而開發的智能轉碼和實時iPhone流媒體播放器已經通過中國聯通的3G網絡測試，同時，客戶已將應科院研發的視頻降噪技術整合至視頻監控產品中。

ECE successfully developed the world's first all-in-one HD STB/PVR
群組成功開發全球第一台集全功能於一身的高清機頂盒/個人視頻錄像機

myID is a multi-purpose platform for education
myID是一多用途教育平台

Launching ceremony of myID
myID發佈儀式

Digital Home Alliances

DHT has formed alliance with China Digital Home Industry Association (operated by China Video Industry Association, CVIA of Ministry of Industry and Information Technology) and Gong Dong Digital Home. This is a critical and strategic step enabling Hong Kong industry and ASTRI technologies to enter the Mainland market.

First Hong Kong e-Book

MMCT enabled the launching of the first e-Book device, myID, in Hong Kong. This device focuses on e-Learning with several unique technology features, such as mobile peer-to-peer framework for e-Learning software application, Adobe Flash, voice-over-IP and e-Book reader with various format supports. Content providers and publishers are also lined up to preload or on-demand download contents into this device for reading and learning. There was broad coverage by media and about 40 schools immediately showed interest in pilot trials of the device.

Multimedia Audio Chip

MTI audio chip offers spatial and bass enhancement plus five-band graphical equalizer features for high-end audio consumer electronic products such as digital photo frames, MP3 players, boom boxes, home theatres and in-car entertainment system. It is currently in mass production. In addition, MTI developed silicon proven test chips for H.264 and AVS decoders. The H.264 and AVS sample ICs were successfully taped out.

數碼家庭聯盟

數碼家庭技術組與中國數碼家庭產業協會(由中國電子視像行業協會、工信部CVIA運作)和廣東數碼家庭組成聯盟。這個關鍵及戰略性步驟，使香港工業界和應科院技術可以進入內地市場。

香港第一台電子書

移動多媒體通訊技術組促成第一台電子書設備myID在香港發佈，這台電子書主要針對電子教學應用，包括多種獨特技術特點：應用在電子教學軟件上的移動點對點框架、Adobe Flash、網絡電話、以及各種格式的電子書閱讀器。內容供應商和印刷商也可安排預裝或隨選下載內容到電子書作閱讀和學習用途。這一成功案例在媒體上得到廣泛的報導，約四十家學校表示有興趣試用此設備。

多媒體音頻晶片

多媒體技術知識產權組的音頻技術提供空間和低音音頻增強功能，兼備五波段圖形均衡器，應用於高端音頻消費類電子產品，如數碼相框、MP3播放器、音箱、家庭影院和車載娛樂系統。目前該音頻晶片正在大規模生產。此外，多媒體技術知識產權組開發經矽驗證的H.264和AVS解碼器的測試晶片，H.264和AVS樣品晶片已成功流片。

Industry Collaborative Project 業界合作項目
F Full Project 正式項目
S Seed Project 種子項目

Project Highlights 重點研發項目

	Project 項目	Description 內容	Duration 時期
F 1	Interactive TV Technologies and Standard - Hong Kong Profile 互動電視技術及香港標準	This project will further enhance HK Interactive TV standard and technologies, boosting digital TV penetration to help the switch of analog TV. It will also extend HK iTV standard/technology to the Mainland via partnership with standard body DHIA. 本項目將會進一步加強香港互動電視標準及相關技術，提升數碼電視的滲透率，加快模擬電視轉換為數碼電視。透過與中國電子工業標準化技術協會數字家庭互動應用標準(DHIA)合作，把香港互動電視標準/技術推廣到中國內地。	Jun 2009 to Sep 2010 二零零九年六月至 二零一零九月
F 2	Next Generation MMI for Digital Home 新一代數碼家庭人機界面互動技術	Research and develop the motion based MMI technologies to enhance user experience as next generation of TV centric remote control. It will enrich user experience of enjoying Interactive TV services, particularly for games, and innovative digital home application in the TV centric digital living. 研發人機界面(MMI)傳感器技術，加強用戶對以電視為中心的新一代遙控器體驗，讓用戶可在以電視為中心的數碼生活中更加享受互動電視服務(特別是遊戲)和各種創新數碼家庭應用。	Jun 2009 to Sep 2010 二零零九年六月至 二零一零九月
F 3	Interactive TV Technologies Platform 互動電視技術平台	Develop TV centric interactive technologies for convergence of Digital TV and broadband connection to meet the fast growing demand in Hong Kong, Taiwan, Mainland and global markets. 開發以數碼電視和寬頻連接為中心的互動技術，以配合香港、台灣、中國內地和全球市場迅速發展的需要。	Jan 2008 to Apr 2009 二零零八年一月至 二零零九年四月
F 4	BE DRM for Embedded P2P IPTV over Internet 適用於嵌入式點對點網絡電視的廣播加密數碼版權管理方案	Develop broadcast encryption based DRM technology and solution for P2P IPTV application on embedded consumer electronic devices or software clients over the Internet. The core technologies to be developed include broadcast encryption crypto technology as well as DRM solution for embedded P2P video broadcast delivery over the Internet. 開發適用於點對點網絡電視嵌入式消費電子設備或軟體終端的廣播加密數碼版權管理技術。核心技術包括嵌入式點對點網絡視頻廣播傳輸所需要的廣播加密引擎和數碼版權管理方案。	Apr 2009 to Jul 2010 二零零九年四月至 二零一零年七月
F 5	P2P IPTV Quality of Experience 點對點網絡電視的質量體驗系統	Implement a suitable metric and methodology for P2P based IPTV Quality of Experience (QoE) measurement, covering overall user experience which ranges from network traffic, P2P performance, interactivity/ responsiveness to AV quality. 針對點對點網路電視的質量體驗而設計的模型和測量方法。覆蓋範圍包括用戶整體體驗，從網絡流量、點對點性能、交互性/反應度以至音視頻質量。	Mar 2010 to May 2011 二零一零年三月至 二零一一年五月
6	High Definition Four/Single Channel Streaming Player Platform 高清晰度四/單通道流媒體播放平台	An Industry Collaborative Project with a Mainland partner to develop High Definition single/four channel streaming player for visual communication and surveillance market. 本業界合作項目，是與來自中國內地的夥伴，合作開發可應用於視像通訊，以及監控市場的高清晰度單通道/四通道流媒體播放器。	Aug 2008 to Oct 2009 二零零八年八月至 二零零九年十月
F 7	Core Multimedia Information Processing Technology and Commercialization, Intelligent Embedded Multimedia Information Processing Platform 核心多媒體訊息處理技術及產業化、智能嵌入式多媒體訊息處理平台	Develop core multimedia technologies for machine processing to achieve better content understanding and rendering, scene analysis, presentation and enhancement. 開發多媒體訊息處理核心技術，以獲取更好的內容理解和顯示、場景分析、訊息表達和增強。	Mar 2010 to Aug 2011 二零一零年三月至 二零一一年八月
F 8	Social Networking Internet Tablet (SNIT) 社交互聯網隨身機	This device utilizes Maemo as the standard open Linux development environment to create a mobile Internet device platform focusing on social networking applications. It mobilizes the Internet and social network. 以Maemo作為標準 Linux開發平台而研發的移動互聯網設備平台，重點開發移動互聯網設備上的社交網路應用，致力實現互聯網及社交網絡的移動化。	Aug 2008 to Jul 2009 二零零八年八月至 二零零九年七月
F 9	Mobile Peer Group Service Platform (MPGSP) 移動對等網絡服務平台	This project offers a development platform on which third parties can build secure, peer-group-based networking and data sharing applications. Internet service providers can offer a variety of likewise services, with technology focus on high availability of resources and mobile devices' transient nature. 本項目為第三方提供一個開發平台，來建立安全的、基於對等組網絡及數據共享的應用。互聯網服務供應商可以利用此平台提供多種服務，特別針對用於達成資源的高可用性及移動設備自組網的短暫特性的應用。	Dec 2008 to Dec 2009 二零零八年十二月至 二零零九年十二月
F 10	Innovative MMI for Mobile Devices (iMMI) 創新的人機界面移動設備	Explore non-traditional Man-Machine Interface (MMI) for mobile devices. Due to its natural limitations - small display and alphanumeric keypad, or lacking a keyboard, traditional mobile device MMI is quite limited in terms of user experience. 探索非傳統的人機界面移動設備。傳統的人機界面由於顯示屏及鍵盤小，或者沒有鍵盤，令用戶的體驗因此受到局限。	Jun 2009 to Sep 2010 二零零九年六月至 二零一零年九月

Industry Collaborative Project 業界合作項目
Full Project 正式項目
Seed Project 種子項目

	Project 項目	Description 內容	Duration 時期
S 11	Mobile Social Networking Framework-Searching in a Personal Content Web (MSNF-S) 移動社交網絡框架—個人內容搜尋網絡	Develop social networking technologies addressing important aspects of sharing personal contents, such as content searching among mobiles and PCs anytime and anywhere. The searching performance over cellular and public WiFi network is also measured. 針對個人內容分享的需要而開發的社交網絡技術，讓用戶可以隨時隨地在移動設備和個人電腦進行內容搜索，並為移動和公共Wi-Fi網絡上的搜索性能進行評估。	Aug to Dec 2010 二零一零年八月至十二月
S 12	E-Book for Education in Hong Kong (e-Books) 適用於香港教育界的電子書	Explore e-Learning method, process, operation and business models associated with this method. It also identifies requirements of the next generation e-Learning device for such method. 探索電子教學方法、過程及與此方法相關的運營和商業模式，及找出新一代電子教學設備的要求。	Dec 2009 to May 2010 二零零九年十二月至二零一零年五月
13	Multimedia Audio Codec SoC ASIC (OMM-SoC) 多媒體音頻編解碼器系統級專用集成電路	Develop a commercial multimedia Audio Codec SoC ASIC in Silterra 0.18µm CMOS technology, with servo control and onboard hardware peripherals such as USB and external CD/DVD controllers, as well as powerful audio processing blocks for enriching audio experience. Such an Audio Codec SoC ASIC provides differentiating features for audio electronic products like digital photo frames, MP3 players, boom boxes, home-theatres and in-car entertainment systems. Discrete ASIC sampling chips and reference design demo are available. 開發商用多媒體音頻編解碼器系統級專用集成電路。此晶片利用Silterra 0.18微米CMOS工藝製成，帶伺服控制及USB硬件，外掛設備和CD/DVD控制器，以及一系列功能強大的音頻處理模組塊，以提高音頻音效。此多媒體音頻編解碼器系統級專用集成電路，為音頻電子產品如數碼相框、MP3播放器、音箱、家庭影院和車載系統等，提供多項特別功能。晶片樣本和參考設計現已提供。	Aug 2008 to Nov 2009 二零零八年八月至二零零九年十一月
14	CMOS High end High Definition Multimedia SoC ASIC CMOS高端高清多媒體系統級專用集成電路	An ICP project between ASTRI and a Shenzhen fabless IC design firm to jointly develop a High Definition (HD) Portable Media Player SoC chip. ASTRI provides the self-owned High Definition Multimedia Platform for this project. This SoC will support the following Audio/Video (AV) standards for many high-end high-definition multimedia player applications. Video standards: HD H.264, HD MPEG1/2/4/VC1/RM/RMVB decoders; Audio standards: MP3, AAC/+, AC3, WMA9 and PCM; Graphic standards: JPEG and MJPEG. 應科院與深圳一家晶片設計公司通過業界合作項目計劃，共同開發高清晰度便攜式媒體播放器晶片。本院為該項目提供高清晰度多媒體平台。該晶片支持以下音頻/視頻標準，適合大多數高端高清多媒體播放器應用。視頻標準：高清H.264、高清MPEG1/2/4/VC1/RM/RMVB解碼器。音頻標準：MP3、AAC/+、AC3、WMA9和PCM。圖像標準：JPEG和MJPEG。	Mar 2010 to Sep 2011 二零一零年三月至二零一一年九月
F 15	Multi Standards H.264/AVS/MPEG2 Low Cost High Performance Full HD Video Decoder SoC (STB SoC) 多標準H.264/AVS/MPEG2低成本高性能全高清視頻解碼器系統晶片	Develop a Full-HD video decoder SoC for home entertainment which is cost-effective for mass production. FPGA Prototype was demonstrated with success at an International IC (China) Trade Show in 2010. It generated keen interest from potential customers. 開發一個可應用在家庭娛樂中心的全高清視頻解碼晶片，符合成本效益，可作大量生產。FPGA原型在二零一零年國際集成電路展(中國)成功演示，並吸引了很多潛在客戶查詢。	Jun 2009 to Dec 2010 二零零九年六月至二零一零年十二月
F 16	Future Multimedia Standards (FMS) 未來多媒體標準	Develop new compression coding tools for future multimedia standards in collaboration with four Hong Kong universities, including CityU, CUHK, PolyU and HKUST. 應科院聯合本地四間大學(城大、中大、理大及科大)研發符合未來多媒體標準的新型編碼工具集。	May 2008 to May 2010 二零零八年五月至二零一零年五月
F 17	Configurable Multi-standard Video Encoder with Embedded DSP Core and Hardware Accelerators (ENC-CMSD) 帶嵌入式數碼訊號處理核心及硬體加速器的可調配多標準視頻編碼器	Develop configurable multi-standard AVS video encoders, including AVS1.0 and AVS-S, with embedded DSP core and hardware accelerator design approach. In addition, DSP core-based FPGA development platform will be purchased to verify the design and deliver FPGA-proven IP. 開發一種基於可配置/可擴展嵌入式數碼訊號處理核心和硬件加速器的多標準AVS視頻編碼器。此編碼器支援AVS1.0及AVS-S。將購置基於數碼訊號處理核心的FPGA開發平台來驗證這個解決方案的FPGA IP。	Feb 2009 to Jan 2010 二零零九年二月至二零一零年一月

Industry Collaborative Project 業界合作項目
Full Project 正式項目
Seed Project 種子項目

	Project 項目	Description 內容	Duration 時期
F	18 Multimedia Platform AVS/H.264 Si-Proven Test Chip Development 開發AVS/H.264矽驗証測試晶片多媒體平台	Develop a H.264 and a China Standard AVS format with resolution up to 1080p so-called Full High Definition Video Decoder ASIC Chip in TSMC 0.13µm CMOS Technology. It also serves as the base for multimedia video decoder SoC design platform supporting multi-CODEC solution that focuses on customer's specific requirements. The key features provided by this platform include: • TSMC 0.13µm CMOS 1P8M generic process H.264 High Profile Video Decoder in HD 1080p resolution capability; • A 250 MHz operation supporting all resolutions from 480i to 1080p; • Supporting two DDR2 SDRAM 533MHz, each up to 512Mbit; and • Internal high performance PLL allowing single crystal to generate clocks. 開發一個H.264及中國標準AVS格式、解析度高達1080p的全高清視頻解碼器台積電0.13µm CMOS的專用集成電路技術晶片。它可用作支援多編解碼方案的多媒體視頻解碼系統級晶片設計平台，配合客戶個別設計要求。此平台的主要特點包括： • 台積電0.13微米CMOS 1P8M通稱進程H.264/AVS高清1080p解析度的高檔視頻解碼能力； • 250MHz操作，支援所有由480i到1080p之解析度； • 支援兩組DDR2 SDRAM 533MHz，每組達512Mbit；及 • 內置高效能PLL容許以單晶體振盪器產生所有必需的時鐘。	Jun 2008 to Aug 2009 二零零八年六月至二零零九年八月
S	19 Ubiquitous Sensor Network Management Platform 無處不在的感測網絡管理平台	Develop a Ubiquitous Sensor Network (USN) with a vision "anywhere, anytime, by anyone, for anything". To achieve this, the architecture for the management platform plays a pivotal role. This seed project investigates the network management architecture for an ubiquitous sensor network (USN) environment so that it • optimizes power usage with lightweight operation; • is resilient to network's harsh conditions; • interoperates with heterogeneous networks; • offers efficient data processing; and • is scalable to accommodate any network size. 開發未來傳感器網絡，實現無處不在的願景。要達成目標，管理平台的架構起著舉足輕重的作用。該種子項目研究網絡管理架構以確保： • 操作輕巧，優化功率用量； • 能適應網絡的苛刻條件； • 在不同架構網絡可相互操作； • 提供高效的數據處理；及 • 可擴展以適應任何網絡規模。	Feb to Aug 2009 二零零九年二月至八月
S	20 Water Purification System Management Platform 純水系統管理平台	This project focuses on the implementation of a water purification system (WPS) in a controller box to be developed in the industrial PC to achieve the followings: • Substantial cost savings; • PLC (programmable logic control) functionalities embedded in controller box; • Security management; • Scalability, flexibility, expandability; • Automated control of output devices; • Historical record of sensor readings; and • Data output in report format for statistical analyses. 本項目的重點是在工業PC內開發的一個控制箱內執行純水系統(WPS)，目標如下： • 節省成本； • PLC(可編程邏輯控制)功能嵌入控制箱內； • 安全管理； • 伸縮性、靈活性、擴展性； • 自動控制輸出設備； • 記錄傳感器的讀數；及 • 以報告格式輸出數據作統計分析。	Sep 2009 to Feb 2010 二零零九年九月至二零一零年二月
S	21 Power Quality Measurement & Analysis in Smart Meters 智能電錶的電能質量測量及分析	Energy management is part of building management system aimed at achieving the followings: • Measure energy usage and power quality; • Increase power efficiency by regulating power usage; and • Control output devices and appliances. 能源管理是智能建築管理系統的一部分，旨在實現： • 準確測量能源用量和質素； • 通過調節功率用量，提高功效；及 • 控制輸出設備和裝置。	Dec 2009 to Jun 2010 二零零九年十二月至二零一零年六月

Mixed-signal SoC
混合訊號系統晶片

Mixed-signal SoC can be applied to many home appliances, toys, motors and even lighting control, offering low power architecture and solution
混合訊號系統晶片可應用於多種家庭電器、玩具、電機，甚至照明系統，提供低功耗架構和解決方案

IC Design Group
集成電路設計群組

The past year has been exciting for IC Design Group. It attracted new talents, defined clear goals, enhanced IC design infrastructure, engaged new customers and created new IPs.
集成電路設計群組過去一年增聘了人才，界定了明確的目標，增强了集成電路設計基本能力，還吸納了新客戶和創造了新的知識產權，表現令人興奮。

The IC Design (ICD) Group was established to enhance Hong Kong's competitiveness in the electronics industry. There are three research teams under ICD, namely Portable Analog & Mixed Signal Design (PAD), Applied SoC Design (ASD), and Optical Communication Circuit Design (OCD). The past year has been exciting for ICD. The group attracted new talents, defined clear goals, enhanced IC design infrastructure, engaged new customers and created new IPs. Its analog and SoC design capabilities were put to good use in several projects. In addition, a new Optical Communication Circuit Design (OCD) team was formed to develop products targeting 10G, 40G and 100G optical communication applications. A technology initiative of high performance computing and networking (HCN) was also started.

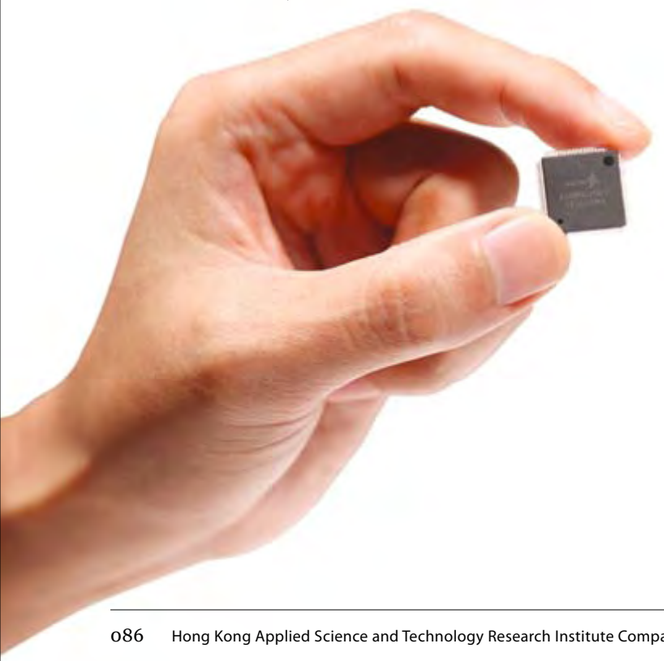
集成電路設計群組的設立是以促進香港電子業的競爭力為目的。群組下設有三個研究組別，分別是便攜式類比混合訊號設計、應用系統晶片設計及光纖通訊電路設計。集成電路設計群組過去一年增聘了人才，界定了明確的目標，增强了集成電路設計基本能力，還吸納了新客戶和創造了新的知識產權，表現令人興奮。群組把類比和系統晶片設計能力活用於多個項目中，又成立了一支新團隊—光纖通訊電路設計組，開發的產品應用於十千兆、四十千兆和一百千兆的光纖通訊，群組更啓動了高性能計算和網絡的研發。

Review 回顧

On the analog front, ICD holds fast to its strategy of developing technologies with real world impact. As it is strongly believed that many of the enjoyable things in life are analog, ICD is currently working on low-cost LCoS (Liquid Crystal on Silicon) imager and LED driver for pico-projectors, ultra low-power Analog to Digital converters for sensing, advanced AC to DC power conversion circuits for LED lighting, motor drivers, electro-static-discharge (ESD) protection devices and circuits, enhancement of a general purpose micro-controller, as well as a renewable energy IC platform.

On the SoC side, ICD is targeting applications in the display and storage segments. Dynamic LED backlight control in flat-panel TVs and a hardware/software solution to eliminate image blurring in fast moving scenes are two of the high profile projects in its display efforts. On the storage front, ICD is developing a NAND Flash memory controller to address the rapidly growing solid state disk market and a USB3.0 controller to target the fast growing video/data segments. In addition, it is developing IP qualification criteria with validation flow and exploring SoCs for health and medical applications.

ICD is working closely with leading industrial partners in Hong Kong, the Mainland and overseas. Since formation in 2005, ICD has filed 48 patents and completed 31 technology transfers to industry. Its team of nearly 100 highly qualified staff is eager to put their talent to practice. The Group will continue offering commercially competitive IPs and total turn-key IC solutions to customers.



Since formation, ICD has filed
自成立以來，群組已提交

48

patent applications
項專利申請

在類比設計方面，集成電路設計群組堅守策略，研發有實際影響的技術。日常生活中，很多使人愉快的物件均是類比設計的，集成電路設計群組目前正開發低成本的矽基液晶（LCoS）成像儀和微投影機LED驅動器、為感應而設計的超低功耗類比數碼轉換器、用於LED照明的直流交流電源轉換電路、電機驅動電路、靜電放電現象（ESD）保護器件和電路、一般用途微控器的增強版，和綠色節能集成電路設計平台。

在系統晶片設計方面，群組以顯示和存儲兩方面的應用為目標。顯示技術的兩項顯著研究成果包括：用於平板電視的動態LED背光控制，及去除快速運動畫面中的模糊影像的硬件或軟件。在存儲技術方面，為配合不斷增長的固態硬盤市場，集成電路設計群組正在研發一項NAND閃存控制器，也同時開發USB3.0控制器，以滿足快速增長的視頻/數據市場。此外，群組正發展具備驗證流程的知識產權質量評測標準，並探索應用於保健和醫療的系統級晶片 。

集成電路設計群組與香港、中國內地以至海外業界翹楚緊密聯繫。群組自二零零五年成立以來，已申請四十八項專利技術，並把三十一項技術轉移予工業界。群組近百名優秀研發人員將繼續發揮專長，爲客戶提供具商業競爭力的知識產權和完善的集成電路解決方案。

Developments 發展

Joining hands with Silicon Valley start-up to expedite data communication
與矽谷科技公司攜手推進數據傳輸速度

Portable Analog and Mixed-signal Design (PAD) Team

The PAD team in its fifth year achieved several remarkable accomplishments. It transferred several key technologies to industrial partners for volume production and launched several initiatives including collaboration with a Silicon Valley company for developing a 65nm CMOS 10 gigabit-per-second Ethernet transceiver chip for long range transmission over multi-mode optical fibres; low-power LCoS imager and LED driver ICs for pico-projectors; ultra-low energy data converter; as well as a robust ESD protection platform for a 200 volt SOI BCD process.

The success of fiscal year 2009/10 has raised PAD's expectation for the coming year. It plans to grow the team further so that it can enter areas of broader impact. It has plans to develop integrated circuit technologies for renewable energy, ultra-low power analog and mixed signal circuits for MEMS sensors, efficient RF power amplifier module technologies for handset and portable applications, and analog and mixed-signal processing ICs for bio-medical applications.

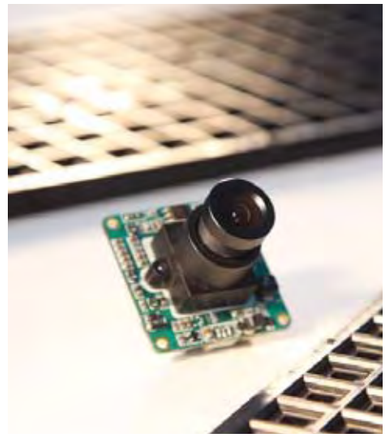
To fuel the growth of its R&D activities, PAD attracted some of the best analog IC design talents in the region. PAD has more than 40 researchers and almost all of them have advanced degrees and varying years of industrial experience. PAD also started a pilot internship programme with support from the Innovation and Technology Commission to train recent engineering and science graduates in advanced IC development. Many have taken this opportunity to gain hands-on IC design experience since the programme was launched early last year.

便攜式類比混合訊號設計組

便攜式類比混合訊號設計（PAD）組在其成立的第五個年頭，獲得多項顯著成果，把多項重要技術轉移至業界夥伴作大量生產，並開創了多個項目，包括與矽谷一間公司聯合開發用於多模光纖長距離傳輸的六十五納米CMOS工藝十千兆位以太網收發晶片、用於微型投影儀的低功耗LCoS成像儀和LED驅動器晶片、超低功耗數據轉換器，及為二百伏特SOI BCD工藝研發的全晶片ESD保護平台等。

本財政年度的成功，提升了PAD組對來年的期望。該組計劃擴大團隊規模以提升效益。未來的研發重點包括：可再生能源集成電路技術、超低功耗類比及混合訊號MEMS傳感器、用於手機和便攜設備的高效射頻功率放大器技術模塊，及用於生物醫學用途的類比及混合訊號處理器晶片等。

爲增強研發的實力，PAD組吸納了許多在區內從事類比集成電路設計的精英加盟。在四十多名的研究人員中，幾乎全數擁有高級學位及多年的業界工作經驗。在創新科技署的支持下，PAD組也開展了實習計劃，培訓工程和理科生開發先進集成電路，計劃自去年年初展開，讓許多畢業生得以累積有關集成電路設計的實際工作經驗。



CCD Analog Front End
CCD感測器類比前端

LED Driver IP Platform
LED驅動器IP平台

Applied System-on-Chip Design (ASD) Team

It has been three years since the ASD team was formed in 2007. Right from the beginning, ASD sets its goals on delivering world-class SoC solutions to customers in Hong Kong, the Mainland and other areas.

During the past year, ASD continued to provide solutions to satisfy customers' needs for high performance and low power SoCs. The team developed low power IC design and enhancement technologies targeting process nodes from deep-submicron (e.g. 0.13μm) to nanometer (e.g. 65nm). In addition, it also completed a comprehensive, robust and silicon-proven platform for IP qualification.

For the mainstream consumer market, ASD developed an easy-to-use, low entry point platform targeting Micro-controller (MCU) development, which is in great demand in Asia, especially from small design houses on the Mainland. MCUs are the driving force behind all sorts of intelligent applications ranging from lighting, home appliances and entertainment to cars. In the computing and storage area, ASD has successfully developed a High Performance Storage Controller Platform for Solid State Disk (SSD) application to address the explosive demand for high performance NAND flash memory in the PC and server markets. It has also started designing an USB3.0 controller.

In the coming years, ASD will continue developing various advanced technologies for high-end markets, including SoC technologies for USB3.0 applications, Frame Rate Conversion (FRC) for LCD TV display, advanced video processing as well as additional SoC technologies for SSD applications.

應用系統晶片設計組

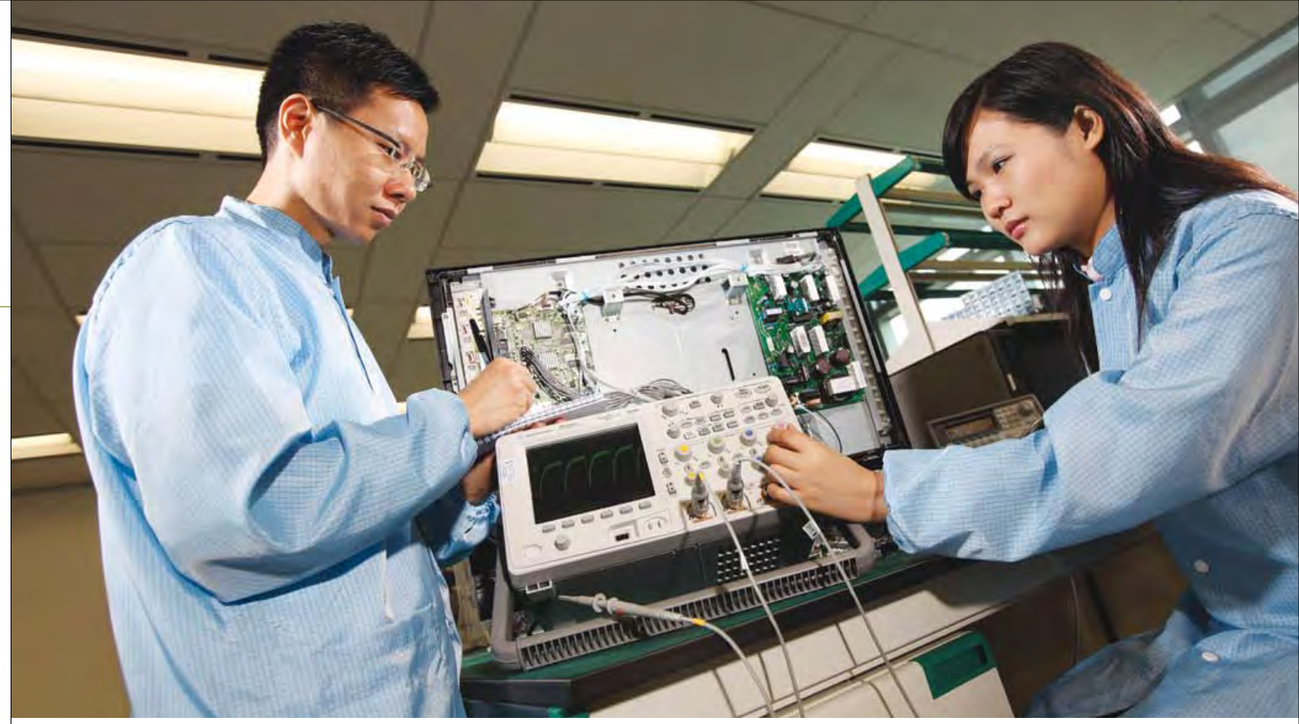
應用系統晶片設計(ASD)組自二零零七年成立至今已達三年。從一開始，ASD組即定下研發目標，為香港、中國內地及其他地區的客戶提供世界級的系統級晶片解決方案。

去年，ASD組為滿足顧客對高性能及低功耗系統晶片的需求，繼續提供解決方案，以從深亞微米(如零點一三微米)到納米(如六十五納米)的工藝節點為目標，開發低功耗集成電路設計和增益技術。另外，團隊還完成了一個全面、強韌及通過矽驗證的知識產權質量評測平台。

ASD組也為主流消費市場開發了易於使用及低門檻的平台，以發展微控器為目標；微控器在亞洲的市場龐大，內地小型設計公司的需求尤其殷切。不論照明、家用電器、娛樂設施以至汽車等各種智能應用系統，均以微控器為驅動核心。在計算與存儲領域中，ASD組成功開發應用於固態硬盤的高性能存儲控制器平台，針對個人電腦以及伺服器市場，滿足高性能NAND型閃存存儲控制技術的龐大需求。此外，該組還開展了USB 3.0控制器的設計工作。

今後ASD組將繼續開發高端市場所需的各種先進技術，包括USB 3.0應用的系統晶片技術、應用於液晶電視顯示的幀率轉換技術、先進視頻處理技術，以及進一步提高應用於固態硬盤的系統晶片技術。

ICD also completed
群組也完成了
31
technology transfers to industry
項技術轉移予工業界



ICD Laboratory
集成電路設計實驗室

Optical Communication Circuit Design (OCD) Team

The OCD team was established in the second half of 2009 targeting at the fast-growing optical fibre communication (OFC) circuit sector. OFC offers a broad range of applications including broadband local access, metropolitan optical networks, backbone networks, optical-RF and consumer opto-electronics.

Optical networks are the key enablers of the new information world and its capabilities will continue to improve through advances in novel system architecture, high-speed ICs and optical devices. With such a high growth potential, there are tremendous business opportunities for optical communication ICs.

Successful implementation of optical communication ICs will facilitate the development and deployment of broadband optical networks. Owing to these innovative optical networks, consumers can enjoy almost instant access to vast amounts of data, audio and video information, as well as affordable global communications. In addition, cloud computing and on-line data storage enabled by high-speed optical networks further enhance its information access, analyses and processing capabilities.

OCD objectives include:

- Developing key high-speed circuits that enable optical fibre communication at data rates of 10, 40 and 100 Gb/s over short and long distances;
- Establishing high-speed packaging and testing technologies to support these key circuits; and
- Establishing ultra-high-speed IC capabilities in Hong Kong to serve local and global telecom and consumer electronics customers.

光纖通訊電路設計組

光纖通訊電路設計(OCD)組於二零零九年下半年成立，針對迅速興起的光纖通訊電路市場。光纖通訊電路的應用範圍廣泛，包括本地寬頻接入、市區光纖網絡、骨幹網絡、光射頻和消費光電子等。

光纖網絡是新訊息世界的重要促成條件，它的能力會隨著新系統架構、高速集成電路和光器件方面的進步而持續提升。預期光纖通訊集成電路市場會高速增長，商機龐大。

光纖通訊集成電路的成功將促進寬頻光纖網絡的發展和使用。有了創新的光纖網絡，消費者可以瞬間接收大量數據、音頻和視頻訊息，同時還可以享受價格合理的全球通訊服務。除此之外，高速光纖網絡協助實現雲端運算和在線數據存儲，進一步提高訊息接收、分析和處理能力。

OCD組的研究目標包括：

- 開發重要的高速電路，促成數據速率爲每秒十、四十及一百千兆的長短距離光纖通訊；
- 建立高速構裝和測試技術，以支持該些重要電路的研發；及
- 建立香港的超高速集成電路能力，服務本地及全球的通訊及消費電子客戶。

Achievements 成果

Portable Analog and Mixed-signal Design (PAD) Team

Several IPs including two high-efficiency LED drivers for general lighting and an integrated analog front-end (AFE) chip for supporting high resolution CCD digital cameras, were transferred to industrial partners. These products are expected to ramp up to very high volume quickly.

PAD made significant technology and commercial progress, filing 19 U.S. patents and more than 10 Mainland patents since March 2007; 10 U.S. patents have either been granted or in the process of being issued. PAD's hard work in commercialization also paid off. The team's R&D funding grew from $2 million in 2008/09 to close to $12.8 million in 2009/10, representing a massive 534 per cent increase in a year. Furthermore, the overall income from industry increased from 8 per cent to 18 per cent, with respect to the project cost. PAD's technical expertise and track record have enabled it to engage globally new customers as well as previous ones.

Applied System-on-Chip Design (ASD) Team

In the past year, ASD signed four licensing contracts totalling more than $1 million. During the same period, it developed an SSD controller, ICs for LCD displays and some key 65nm CMOS analog IPs, which brought in more than $2.5 million income from industry. In addition, ASD filed three U.S. patents and one of them was granted.

In the areas of technology licensing and commercialization, ASD held productive talks with various local and Mainland customers exploring collaborations in SSD, LCD TV display processing and IP qualification criteria and validation. Customers include Mainland's second largest server company, a major IP exchange company in Shanghai and many IC design houses.

Furthermore, ITC granted ASD an ICP to develop a super-speed USB3.0 application processor. In this project, the industrial contribution is about $7 million and the project will start shortly. Moving forward, the main ASD thrust will focus on total IC product solutions in areas of super-speed connectivity for storage, display and health care.

便攜式類比混合訊號設計組

便攜式類比混合訊號設計組已把多項知識產權轉移給業界，包括兩項高效LED驅動器，分別用於普通照明及支持高分辨率CCD數碼攝影機的集成類比前端晶片。預期這些產品於短期內大量生產。

PAD組在技術創新和商業化方面，均有長足進展，自二零零七年三月以來，已經申請了十九項美國專利和十多項中國專利，其中十項美國專利已經獲得批准或正獲簽發。PAD組在商業化方面的努力也見成績，團隊的研發基金從去年二百萬元增長至本年度接近一千二百八十萬元，一年間大幅增加了百分之五百三十四。另外，項目經費中整體業界投入的資金由百分之八增長至百分之十八。PAD組在技術上累積的經驗和業績，使它能從全球吸引新舊客戶。

應用系統晶片設計組

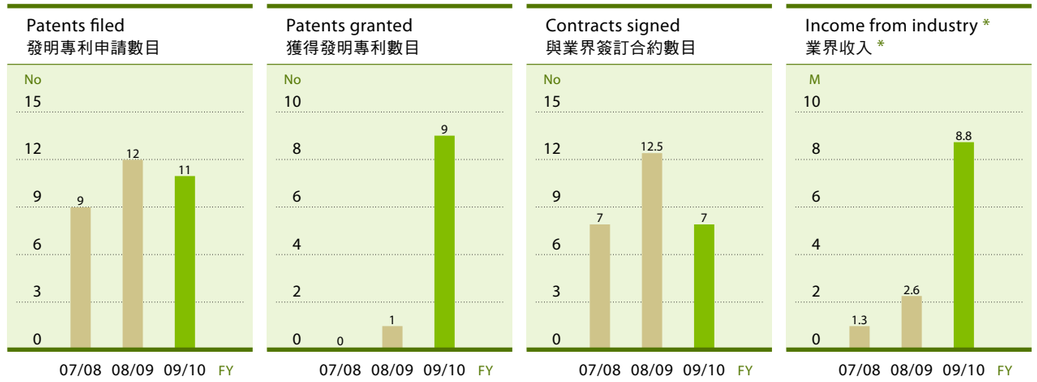
過去一年應用系統晶片設計組共簽署了四份特許專利合同，金額超過一百萬元。同期，ASD組也開發了一個固態硬盤控制器、多個應用於液晶顯示的集成電路，以及一些重要的六十五納米CMOS類比知識產權，帶來了二百五十萬元的業界收入。另外，ASD組提交了三項美國專利申請，其中一項已獲授權。

在技術轉移和商業化方面，ASD組與本地和中國內地客戶進行多項具成效的協商，在固態硬盤、液晶電視顯示處理和知識產權質量評測與驗證等領域，尋求合作商機。客戶包括一家中國內地第二大伺服器公司、一家位於上海的知識產權交易公司和多家集成電路設計公司。

此外創新科技署已授權ASD組開展一項業界合作項目，開發超高速的USB 3.0應用處理器。該項目即將啟動，業界投入的資金約七百萬元。下階段ASD組將集中為客戶提供超高速存儲連接、顯示和保健領域的集成電路產品完整解決方案。

Noise Cancellation Headset
消噪耳機

A noise cancellation headset ensures user's greatest audio enjoyment even in a noisy environment
即使身處嘈雜環境，消噪耳機都可以為用家帶來優質聽覺享受



No number 數目 M million (HK$) 百萬(港元) FY fiscal year 財政年度
* received cash and in-kind 實收現金和物資資助

Project Highlights 重點研發項目

Industry Collaborative Project 業界合作項目
Full Project 正式項目
Seed Project 種子項目

	Project 項目	Description 內容	Duration 時期
Portable Analog and Mixed-signal Design (PAD) Team 便攜式類比混合訊號設計組			
1	10 Gigabit Ethernet Silicon IP Platform 十千兆位以太網矽IP平台	Develop a silicon IP platform for 10 gigabit Ethernet PHY transceiver product families and establish the R&D methodology for designing low-power multi-gigabit transceiver for the next generation high-speed networking applications in 65nm CMOS and smaller process technologies. The goal is to enable partners to deliver 10GbE transceiver products to serve the high-speed Ethernet market. The high-speed, mixed signal design methodology and the silicon IP platform will also benefit HK's electronics industry in developing high-speed integrated circuits for next generation networking application. 開發十千兆位數據傳輸以太網收發機的矽IP平台，並研究應用於新一代高速網絡的65納米CMOS的低功耗千兆位收發機的設計法。研究目標是協助合作夥伴推出十千兆位以太網收發機產品，以滿足在增長中的以太網市場。高速混合訊號設計方法和矽IP平台的開發，使香港電子工業界在研究新一代高速網絡應用的集成電路時能夠受惠。	Apr 2009 to Apr 2011 二零零九年四月至 二零一一年四月
F 2	High Voltage Motor Driver Silicon IP Platform 高壓電動機驅動器矽IP平台	Explore the high voltage, high-power analog driver controllers for motors and actuators used in space limited electronic products, like auto-focusing mechanisms in cameras and display projectors. These high voltage motor drivers are in high demand in consumer, industrial and automobile segments of semiconductor industry. This project will deliver a library of HV silicon IP to local fabless design houses to implement single chip motor driver IC. 研究高電壓、高功率模擬控制器驅動電動機和傳動裝置，用於細小的電子產品，如照相機、微型投影機的自動對焦機制。高電壓模擬的驅動程式在消費、工業及汽車領域的半導體工業需求龐大。該項目將提供高壓矽IP庫給本地無晶圓廠設計公司，以單晶片實現電機驅動器集成電路。	Jun 2009 to Dec 2010 二零零九年六月至 二零一零年十二月
S 3	Integrated AMS Driver Platform for Pico-projectors 微型投影儀混合訊號集成電路驅動平台	Initiate a feasibility study to be followed by the design and simulation of silicon IP blocks enabling development of a fully integrated mixed signal driver IC for Pico Projectors. After completion of the seed project, the proven concepts and designs will be used to engage in full projects with leading manufacturers and components suppliers in the pico-projector industry. 開發應用於微型投影儀的全集成混合訊號驅動晶片的前期可行性研究及IP模組的設計驗證。待種子項目完成後，與微型投影儀製造商及元件供應商合作，可以利用已驗證過的先進概念和設計，開發正式項目。	Jul 2009 to Jan 2010 二零零九年七月至 二零一零年一月
F 4	ESD Design and Device Modelling ESD設計與器件模型	Develop simulation-design methodology for ESD design, including • prediction capability; • optimization capability; and • design capability. The design-of-experiments modelling approach is used as the basis of a complete IC ESD design methodology. This methodology will employ Synopsys TCAD as the simulation tool, and use empirical modelling to predict I-V snapback characteristics and ESD withstand level of a circuit given the circuit's layout parameters. The development of ESD simulation-design capability will fill the technology gap in ESD designs. Methodology will provide the technical drive needed in IC ESD protection. 開發ESD仿真設計法，包括： • 預測能力 • 優化能力 • 設計能力 該項目所提出的實驗設計建模方法將作為一個完整設計方法的基礎，並利用Synopsys公司的TCAD作為工具，利用經驗模型來預測電路的I-V特性和抵抗ESD的水平。ESD仿真設計能力的發展，填補ESD設計的技術空白，為集成電路的ESD保護提供明顯的技術驅動。	Jul 2009 to Dec 2010 二零零九年七月至 二零一零年十二月
S 5	Advanced AC-DC Power Conversion Platform for LED SSL 應用於LED照明的先進交直流電源對換平台	This project targets at AC-DC LED lighting. ASTRI will define specifications of key analog blocks to cover a broad range of AC-lined LED Driver. ASTRI will then build behavioural simulation models for the blocks to establish a technical reference for future silicon implementation. Finally, there will be some test chips with the necessary building blocks for AC-DC LED driver to be taped out. 此項目針對交直流電源的LED照明。首先，應科院會定義覆蓋大範圍應用的交流LED驅動器中主要模擬電路模塊的規格，然後建立模型以模仿在矽技術下實現該電路的特性。最後，還需要搭建交流LED晶片的模塊。	Jan to Jun 2010 二零一零年一月至 六月

Industry Collaborative Project 業界合作項目
F Full Project 正式項目
S Seed Project 種子項目

	Project 項目	Description 內容	Duration 時期
F 6	Ultra-Low Energy Analog-to-Digital Converter Technologies 超低功耗模數轉換器	Analog-to-digital converter is used to interface physical environment and the digital domain. The emerging portable medical and micro-sensor devices have stringent requirements on energy consumption. Ultra-low energy data converter is key technology to facilitate such applications and extend battery life. The programme's core building blocks include ultra-low energy successive approximation register (SAR) and multi-stage sigma-delta analog-to-digital converter. These IP blocks will become the initial prototype IC subsystem which can later be reused to build more complex integrated system. 模數轉換器是連接現實世界和數碼領域的介面。新興的攜帶型醫療器材和微傳感器對能量消耗有嚴格的限制，超低功耗的模數轉換器是滿足這類應用的關鍵技術，因為它能延長電池的壽命。此項目的核心模塊是超低功耗連續漸近暫存器(SAR)和多級Sigma-delta模數轉換器。這些IP模塊首先是一塊IC原型晶片，然後作爲子系統複用到更複雜的集成電路系統中。	Feb 2010 to Aug 2011 二零一零年二月至 二零一一年八月
F 7	Integrated LCoS Imager IP Development For Pico-projectors 應用於微型投影儀的矽基液晶(LCoS)集成影像晶片的IP開發	Develop a suite of silicon IPs for LCoS imagers to be used for pico-projector development. These silicon IP blocks will enable licensees to develop application specific imager IC based on Liquid Crystal on Silicon (LCoS) display technology. The core of this integrated circuit technology is the specialized SRAM and its control circuitry in 0.18 micron CMOS process. The full custom methodology will be used for all required circuits. ASTRI will be responsible for all circuit related R&D while its initial partner will use its system application level expertise to ensure these IP blocks are properly deployed in commercially viable pico-projector imager ICs. Furthermore, ASTRI will work closely with selected local silicon manufacturing companies to guarantee successful processing of the LCoS panel wafers. This type of display technology has received strong recognition by the Central Government and is forecasted to grow significantly in the next few years. 開發一套應用於微型投影儀的矽基液晶(LCoS)成像系統的IP模組。獲授權者可以使用這些IP模組，開發應用於LCoS成像系統的積體電路晶片。本晶片的核心技術是在0.18微米CMOS工藝上實現專用靜態隨機記憶體及其控制電路，計劃採用全定制方法完成所需電路的設計。應科院將負責所有相關電路的研發。合作夥伴根據其在系統應用方面的經驗作調整，確保這些IP模組能夠成功被應用於商業微型投影儀成像晶片的開發上。另外，應科院將與一些本地晶片製造商合作，確保LCoS晶圓成功製造。此成像顯示技術受到國家的高度重視，預計在未來數年，市場將快速增長，具有良好的商業前景。	Mar 2010 to Aug 2011 二零一零年三月至 二零一一年八月
S 8	Ultra-Low Energy Analog-to-Digital Converter Technologies for Wireless Sensors 應用於無線傳感器的超低功耗模數轉換器	Applications like wireless sensor nodes require small form factor, limited power and ad hoc deployment with unattended operation. Ultra-low energy analog-to-digital converter (ADC) is a vital product in extending the operating time of such applications, thus making their deployment practical. This programme aims at developing an ultra-low energy analog-to-digital converter (ADC) operating at 1.0V supply voltage using the 0.18µm CMOS technology. 像無線傳感器節點這類應用，要求體積小、功耗低和靈活性良好，超低功耗模數轉換器的技術重點是延長運作時間，就能夠滿足以上要求。本項目要開發在一伏特電壓下應用0.18微米CMOS技術的超低功耗模數轉換器。	Dec 2008 to Jun 2009 二零零八年十二月至 二零零九年六月
F 9	Mixed Signal System-on-Chip (AMS SoC) Design Platform 混合訊號片上系統設計平台	Due to demand for mixed-signal SoC applications and the complexity and size of circuits in a system, more and more companies are taking advantage of outsourcing design resources. This project aims at providing local design houses with a mixed-signal development platform with high performance analog IP library which enables them to improve performance and reliability and compete in the world market. 由於市場對於混合訊號SoC的應用需求不斷增長，加上複雜的電路和它們在系統上需佔用的空間越來越大，現時很多企業都選擇利用外部的設計資源。本項目為本地的集成電路設計公司提供一個混合訊號開發平台及其高性能的類比IP庫，協助他們改良產品設計的性能及可靠性，增強在世界市場的競爭力。	Mar 2008 to Sep 2009 二零零八年三月至 二零零九年九月
F 10	LED Driver Lighting Solutions LED照明驅動方案	This project delivers two whole chip DC-DC LED driver solutions: 350mA and 1A constant current drivers. The LED driver is capable of driving single or multiple series connected to LED efficiently from a voltage source higher than the LED voltage. The 350mA and 1A LED drivers can deliver seven watts and 21 watts of output power respectively, depending on supply voltage and external components. As LED driver is highly integrated, only a few external components are needed to complete a LED lighting solution. These ASTRI LED drivers are especially suitable for lighting products which require small form factors such as the MR16. 此項目提供直流對換的LED驅動器雙晶片—350mA及1A恆流驅動器。只要輸入電壓高於串起來的LED，這兩個LED驅動器就能夠有效地驅動單個或多個串聯的LED。若果輸入的電源和外部元件均合適，350mA和1A的LED驅動器分別可達到7W和21W的輸出功率。由於LED驅動器是一個高度集成的晶片，所以不需要很多外部元件就能擬訂出一個LED照明方案。它特別適用於尺寸細小的照明產品，例如MR16射燈。	May 2008 to Aug 2009 二零零八年五月至 二零零九年八月

Industry Collaborative Project 業界合作項目
F Full Project 正式項目
S Seed Project 種子項目

	Project 項目	Description 內容	Duration 時期
Applied System-on-Chip Design (ASD) Team 應用系統晶片設計組			
S 11	Hardware Optimized Motion-frame Interpolation 動態畫面插值的硬件改良	Develop a hardware optimized algorithm to reduce motion blurring effects on LCD TVs. Provide a solution to double the frame refresh rate for LED backlight based LCD TV, e.g. from a 60Hz refresh rate to a 120Hz refresh rate. 開發硬件改良技術，以減少液晶電視上動態模糊的情況。此技術所提供的解決方案，是以雙倍速度，例如由60到120赫茲，更新LED背光液晶電視的圖像。	Apr to Sep 2009 二零零九年四月至九月
F 12	Active Dynamic LED Backlight Control ASIC Development 主動式動態LED背光控制晶片開發	Develop an ASIC optimizing LED Backlight Control: both Gray level only and RGB local dimming. This IC high energy saver will deliver better image quality. Each LED module can have a different set of parameters – panel size, LED to LCD pixel ratio and LED light distribution profile. This adaptive implementation plan supports the most prevalent panel configurations and characteristics used in industry. This flexibility allows industry partners to deploy the solution in multiple LED-based display systems without the need to redesign and re-spin the ASIC, saving much cost. 開發LED背光控制晶片，包括灰度和RGB的調光。該集成電路的高節能器將提供更佳的圖像質素。每個LED模塊可以有不同的設置，例如面板的大小、LED與LCD像素比例和LED光分佈情況等。此方案能配合業界現時普遍採用的板面配置。這種靈活性使業界合作夥伴可應用此晶片在多個LED顯示系統，而不需要重新設計或重組集成電路，從而大大節約成本。	Jun 2008 to Jul 2009 二零零八年六月至二零零九年七月
F 13	Nanometer SoC Design Technology 納米系統級晶片設計技術	Reduce IC development cost in third party IP licensing, commonly needed Silicon IPs are included in the Nanometer SoC Design Platform. In addition to Silicon IPs, this platform also contains process node independent soft IPs such as SSD controller, USB3.0, 8051 MCU core, etc. Many different types of SoCs can be created by leveraging the rich resources of this platform. 為減低第三方使用者的IP許可證費用而設的納米系統級晶片設計平台。此設計平台包括一些自主開發的通用IP硬核和其他IP軟核，如SSD控制器、USB3.0和8051MCU核等。第三方可以利用這個平台，開發出各種不同功能的SoC產品。	May 2009 to Oct 2010 二零零九年五月至二零一零年十月
F 14	High Performance Storage Controller Platform 高性能存儲控制器平台	Develop high performance NAND Flash memory controller platform which includes the silicon IP, a test chip with SATA and the development FPGA board platform with related firmware. It will target at the huge market demand for high performance NAND Flash memory storage, especially the mass data storage application in the PC market. This IP will become core technology for the development of SSD which is viewed by many people as the disruptive technology that replaces the rotating hard disk. 開發先進高性能控制器存儲平台，包括用於NAND Flash的矽IP、集成SATA接口控制測試晶片及一個FPGA的NAND Flash控制開發板和相應的硬件。該平台因應市場對高性能NAND Flash存儲應用的需求，尤其是大量數據存儲應用的電腦市場而設。SSD固態硬盤被認為是可取代傳統硬盤的替代技術。	May 2009 to Oct 2010 二零零九年五月至二零一零年十月
F 15	Common Platform for IP Qualification 知識產權質量驗證通用平台	Develop a platform for qualifying IPs using a set of common standards among IP vendors, customers and evaluators. The common standards include documentation completeness, feature and performance verification, physical and logical integration guides and silicon proven history. By using this common platform, the risk of SoC failure due to poor IP quality will be greatly reduced. 研發一個用於評測知識產權(IP)質素高低的通用平台。它利用IP設計者、IP使用者及IP評估者之共同標準來評測IP的質素。這些通用IP評測標準包括：IP使用說明文檔的完整性、功能和性能確認、物理和邏輯功能的整合指引，及矽確認紀錄等。利用此平台將可以大幅降低劣質IP引致的SoC設計失敗的風險。	Sep 2009 to Nov 2010 二零零九年九月至二零一零年十一月

LED Street Lamp
LED路燈

LED street lamps powered by ASTRI's technology were installed on a main road in Shenzhen
在深圳一條主要道路上，安裝了以應科院技術開發的LED路燈

Reports of R&D Groups and Subsidiary
研發群組及附屬機構報告

Material & Packaging Technologies Group
材料與構裝技術群組

The main goal of the Material & Packaging Technologies Group is to develop customer-focused technologies and product prototypes laying a solid foundation for Hong Kong and the Pearl River Delta.
材料與構裝技術群組一直致力研發顧客導向的技術及產品原型，為香港及珠江三角洲奠定鞏固的基礎。

Since establishment in 2005, the main goal of the Material & Packaging Technologies (MPT) Group is to develop customer-focused technologies and product prototypes laying a solid foundation for Hong Kong and the Pearl River Delta to become a major centre for designing and manufacturing next-generation devices and key components for worldwide information and communications technology industries. MPT has launched five key technology initiatives to meet the increasing needs of industries in Hong Kong and the Mainland, they are:

- Display Systems;
- LED Lighting;
- Advanced Packaging Technologies;
- Photonic Components; and
- Device Fabrications.

自二零零五年成立至今材料與構裝技術群組一直致力研發顧客導向的技術及產品原型，為香港及珠江三角洲奠定鞏固的基礎，使之成為給世界各地資訊和通訊技術工業，設計和製造新一代器件和重要元件的主要中心。群組主力發展下列五個重點科技項目，以滿足香港及內地業界與日俱增的需要：

- 顯示系統；
- LED照明；
- 先進構裝技術；
- 光電子元件；及
- 器件研製。

Review 回顧

During the year, MPT filed 64 patent applications and was granted 16 patents. These innovations have been considered very useful to industries in Hong Kong and the Mainland as 14 companies were licensed to use these MPT patents on 22 occasions, turning them into actual applications this year.

The following 10 breakthroughs illustrate actualization of these innovations to industry.

- High power LED MR16 spot lamps with two U.S. patents granted for high efficient heat dissipation. As a result of this patent-protected technology, the LED junction temperature is further reduced to 70°C and the luminaire efficacy is increased to 74lm/W significantly at 5W input power. OPTILED Lighting International Ltd. commercialized this heat dissipation technology and launched two products, i.e. Accent Six Star MR16 and Super Star MR16 spot lamps, in Hong Kong and the world with success.
- High-brightness LED street lamp technology achieved system efficacy up to 70 lm/W, using 90 lm/W LED component. The cost-effective and reliable LED street lamp technology was transferred to six companies in Hong Kong and the Mainland. The LED street lamps were installed in Hong Kong, Shenzhen, Guangzhou, Dalian, Xi'an, Shandong and Jiangsu. The street lamp won the Silver Award of Best Lifestyle in Hong Kong ICT Awards 2009.
- World's smallest and highest resolution pico-projector, at just 4cc (WVGA, 854x480 resolution) and 9cc (WSVGA, 1024x600 resolution). This technology was licensed to four Hong Kong and Mainland companies, which will launch products soon. During CES 2010 in Las Vegas, MPT licensee, Foryou Multimedia Group, announced the launching of the pico-projector products jointly-developed with Syndiant.
- World's thinnest double-sided LCD display (15mm) through novel LED backlight design. ASTRI's active dynamic LED backlight solution was licensed to seven Hong Kong and Mainland companies for applications in TVs and public information displays (PIDs).
- High power vertical LED chips with sapphire substrate removed using polishing method to attain the best thermal management. The unique patent portfolio supporting this technology was licensed to a Taiwan and a Mainland companies.

群組在本年度共申請六十四項專利，獲發專利則達十六項。多個創新項目獲香港及國內企業所肯定，群組授權專利予十四家企業達二十二項次，並成功應用至實際生產。

以下十項技術突破說明了這些創新項目在業界如何大派用場：

- 高效能LED MR16射燈，因其高效率散熱而獲得兩項美國專利。此受專利保護的技術將LED接合點的溫度進一步減低至攝氏七十度，及將五瓦燈具的效率顯著地提升至每瓦七十四流明(lm/W)。奧的亮照明國際有限公司把這項散熱技術商品化，並生產了兩款產品，即Accent Six Star MR16及Super Star MR16射燈，在香港及全球各地成功銷售。
- 高亮度LED路燈技術造就了可靠性高及具成本效益的LED路燈系統，在使用九十流明(lm/W)的LED器件的設計下，系統光效可達七十流明(lm/W)。該項技術已轉移給在香港及國內的六家企業。群組已於香港、深圳、廣州、大連、西安、山東及江蘇等地安裝LED路燈。LED路燈技術並獲得二零零九年度香港資訊及通訊科技獎之最佳生活時尚獎銀獎。
- 全球最小巧、解像度最高的微型投影儀，體積僅為四立方公分(WVGA，854x480像素)和九立方公分(WSVGA，1024x600像素)。這項技術已授權給香港及中國內地四家企業，產品即將推出市面。在二零一零年美國拉斯維加斯國際消費電子展上，獲此技術授權的中國華陽多媒體電子有限公司宣佈其與Syndiant聯合開發的微型投影儀產品面市。
- 全球最薄的雙面液晶顯示器(僅十五毫米)採用先進新穎的LED背光設計。應科院的主動式動態LED背光解決方案，已經授權給七家香港及中國內地企業，將技術應用到電視和公共訊息顯示屏(PID)上。
- 大功率的垂直LED晶片，使用拋光法剝離藍寶石基板，達至最佳導熱效果。此獨特的專利技術已轉移給兩家分別在台灣和中國內地的企業。

Tyre Pressure Monitoring System
胎壓監測系統

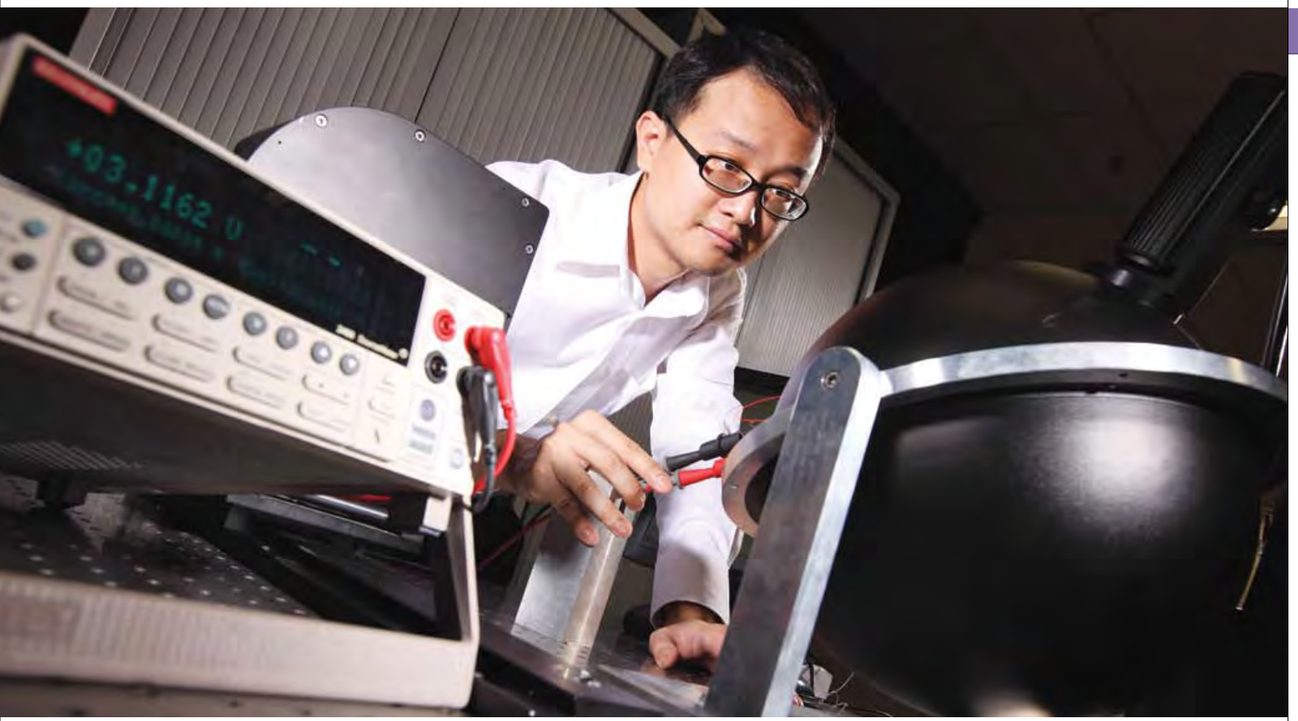
Drivers can monitor tyre condition by using ASTRI's Tyre Pressure Monitoring System
駕駛者可以利用應科院的胎壓監測系統來監測輪胎狀況

- Innovative design adviser software for 3D package-on-package (PoP) was demonstrated and released to more than 30 companies mainly located in Hong Kong and the Mainland for shortening design cycle time of 3D packages.
- Pulse oximetry and pulse rate measurement for portable consumer electronics applications, including effective algorithm and patented packaging miniaturization. This technology was licensed to a tier-one mobile phone manufacturer on the Mainland.
- Tyre Pressure Monitoring System (TPMS) including four sensor and one receiver module was licensed to a tier-one semiconductor manufacturer on the Mainland.
- VCM-based 3D anti-shaking camera module was licensed to a Mainland company for mass production. The module won a Certificate of Merit, Best Lifestyle in Hong Kong ICT Awards 2009.
- First Chinese MEMS ink jet "China Head" for wide format printing and subsequent printed electronics offers 600dpi with 299 nozzles wide, high throughput print swath.

MPT has made remarkable achievements by doubling the number of technology transfers to industry from 20 to 40, bringing in more than $10 million income from industry this year from companies in Hong Kong, Taiwan and the Mainland.

- 三維疊層構裝創新設計顧問軟件在本地及中國內地成功授權予超過三十家企業使用，以縮短其花在三維構裝設計上的時間。
- 應用於便攜式消費電子的脈衝血氧定量計及脈衝測量，包括其有效算法和專利微型構裝技術，已授權予中國內地一家首屈一指的移動電話製造商。
- 胎壓監測系統包含四個傳感器及一個接收器模塊，已獲中國內地一家頂尖半導體生產商採用。
- 三維音圈馬達防抖攝像模塊已授權予中國內地一家公司量產。此防抖攝像機模塊獲二零零九年香港資訊及通訊科技獎之最佳生活時尚獎優異證書。
- 中國內地首台微機電技術的噴墨打印頭—「中國噴墨頭」共有二百九十九個噴嘴，可達六百dpi解像度及高產量的列印寬度，應用於寬幅印刷和電子印刷上。

本年度材料與構裝技術群組在技術轉移方面取得顯著成果，由去年的二十項倍增至四十項，取得來自香港、台灣及中國內地公司的業界收入超過一千萬元。



LED luminance and spectrum measurement
LED亮度與光譜測量

With innovations and breakthroughs, MPT received the following five major awards. More details are set out in the chapter "Honours for Staff".

群組藉著技術創新和突破，本年度獲得五個重要獎項，詳情刊於〈 員工的卓越成就 〉一章內。

Silver Award, Best Lifestyle, Hong Kong ICT Awards 2009	二零零九年香港資訊及通訊科技獎之最佳生活時尚獎(銀獎)
Certificate of Merit, Best Lifestyle, Hong Kong ICT Awards 2009	二零零九年香港資訊及通訊科技獎之最佳生活時尚獎(優異證書)
Award of Merit, Energy Saving Product Award, Environmental Protection & Friendly Business Award 2009, Hong Kong	二零零九年香港環保「友」道企業大賞之節能產品獎(優異獎)
Best Paper Award, International Conference on Electronic Packaging Technology & High Density Packaging (ICEPT-HDP) 2009, China	二零零九年中國電子構裝技術及高密度構裝國際會議之最佳論文獎
Merck Award for Outstanding Scientific Contribution to the Display Technology, International Meeting on Information Display (IMID) 2009 in Seoul, Korea	二零零九年韓國國際信息顯示會議之傑出科學貢獻默克獎

Developments 發展

In light of the increasing needs and demands of the industries in Hong Kong and the Mainland, MPT has expanded its key technology initiatives from four last year to five this year:

Display Systems (DS) Programme

During the year, the DS Programme filed 12 patent applications and was granted two patents. It also signed six industry contracts for technology dissemination.

The programme developed the world's smallest high-resolution pico-projection module and licensed it to four companies which will start production soon. During CES 2010 in Las Vegas, one of our licensees, Foryou Multimedia Group, announced the launching of the pico-projector products jointly-developed with Syndiant.

The programme also developed an ultra-thin double-sided LCD display for digital signage application and a novel and low-cost optical touch-sensing panel with multi-touch and gesture recognition capability for large-size display application. Its active-dynamic LED backlight control module was licensed to several tier-one LCD TV companies on the Mainland and the final products will be launched in the coming year. The benefits this technology brings include better colour gamut with NTSC >105 per cent, excellent on-screen contrast, reduced thickness (as thin as <10mm) enabled by side-emitting LED backlight technology for LCD televisions.

Looking forward, the programme will further build and/or integrate the following technologies to deliver innovative and interactive display systems:

- Optical engine;
- Image processing;
- Detection and recognition; and
- Human-machine interactive technology platforms.

The target markets are home TVs, digital signage displays, advertising, mobile phones and related consumer electronics markets.

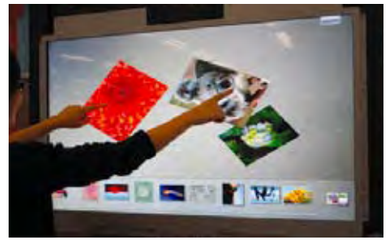
World's smallest high-resolution LCOS pico-projector
全球最輕巧的高解析度LCOS微型投影機

鑒於香港及中國內地業界的需求及要求不斷提高，材料與構裝技術群組把重點科技項目從去年的四個增至本年的五個：

顯示系統組

本年度顯示系統組提交了十二項專利申請，另取得兩項專利，以及簽訂了六項技術轉讓合同。

顯示系統組開發全球最小巧的高解像度微型投影模塊，並授權給四家公司，短期內開始量產。在二零一零年美國拉斯維加斯國際消費電子展上，獲此技術授權的中國華陽多媒體電子有限公司宣佈其與Syndiant聯合開發的微型投影機產品面市。



Large-size multi-touch display
大尺寸多點觸摸顯示器

此外，顯示系統組還開發了應用於電子告示牌的超薄雙面液晶顯示器，以及嶄新而低成本的多觸控兼具手勢識別功能的光學觸摸感應面板，可應用於大屏幕顯示。研發團隊的主動式動態LED背光控制模塊已授權給中國內地多家首屈一指的液晶電視製造商，產品將在明年推出。這項技術的優勢包括，色域大於NTSC制式的百分之一百零五，屏幕對比度甚佳，加上LCD電視機使用側發光LED背光技術後，厚度得以減少(薄至十毫米或以下)。

展望未來，顯示系統組將進一步建立和整合以下技術，以提供創新和互動的顯示系統：

- 光學引擎；
- 圖像處理；
- 檢測與識別；及
- 人機交互技術平台。

以家庭電視、電子告示牌顯示器、廣告、流動電話及相關消費電子產品為目標市場。

Wireless lighting-control system creates unique atmosphere
利用無線燈光控制系統營造獨特氣氛

LED Lighting (LL) Programme

During the year, the LL Programme filed fourteen patent applications and was granted four patents. It signed 19 industry contracts for technology dissemination, proving the popularity of LED lighting technologies among customers in Hong Kong and the Mainland.

The programme has carried out extensive R&D on LED package design, LED lighting luminaries design and LED lighting application. The programme developed the LED spot lamps with patented thermal management solution, creative wireless lighting control system with transmission distance up to 150m (line of sight) and intelligent LED street lamps that save 30-40 per cent energy compared with conventional light sources.

While the Government is aggressively pushing for more energy saving lighting solution, the programme has been working closely with licensees in commercializing LED spot lamps and LED street lamps. One of our licensees, Optiled Lighting International Ltd., commercialized MPT's LED technologies and launched two products - Accent Six Star MR16 and Super Star MR16 spot lamps which are available in over 300 lighting chain stores in Hong Kong and the world.

LED照明組

本年度，LED照明組共提出十四項專利申請，另已取得四項專利。針對香港與中國內地LED產業，LED照明組與業界簽訂了十九份合同，提供LED照明相關技術與服務。

LED照明組進行了大規模的LED構裝設計、LED燈具設計以及LED照明應用等相關科研專案。相關研發成果計有獲熱管理解決方案專利的LED射燈、創新之遠距離傳輸(達一百五十米以上)無線燈光控制系統，以及節能的智慧型LED路燈，其節能效果相較傳統燈源達百分之三十至四十。

正當政府大力推動更節能的照明解決方案，LED照明組與授權企業緊密合作，致力於LED射燈及LED路燈技術商品化。其中一個成功案例是，奧的亮照明國際有限公司採用應科院授權的LED相關技術，推出了兩款產品—Accent Six Star MR16及Super Star MR16射燈，於香港及世界各地超過三百家電器燈具連鎖店銷售。

LED Street Lamp
LED路燈

LED MR16 Lamps
LED MR16射燈

The programme collaborated with six licensees in developing high brightness LED street lamps. These LED lamps were installed in major cities on the Mainland including Shenzhen, Guangzhou, Dalian, Xian, Shandong and Jiangsu. Moreover, the programme has been working closely with the Government and public utilities such as Hong Kong Science Park for trial installation of LED street lamps in public areas for comprehensive field tests and evaluation.

In the coming year, the programme targets to build and deliver innovative lighting solutions with respect to the following applications:

- Wafer level LED system-in-package (SiP) technology;
- Multi-purpose light engines;
- Adaptive floor plan lighting control system; and
- Moving object recognition and motion sensing system.

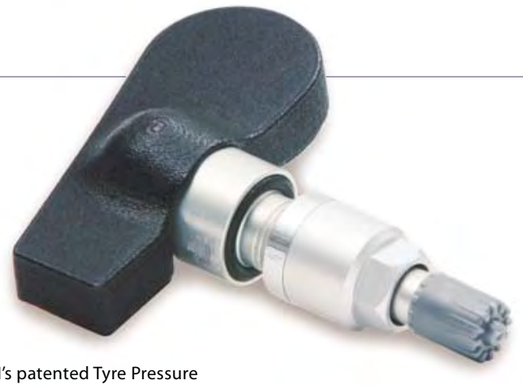
研發團隊並致力與六家獲授權企業共同開發高亮度LED路燈，並於深圳、廣州、大連、西安、山東及江蘇等內地主要城市進行安裝測試。此外，LED照明組與政府及公共機構如香港科學園緊密合作，以試點安裝專案方式將LED路燈設置於香港的公共區域道路，以進行完整的實地測試及評估。

未來數年，LED照明組將針對不同的照明應用領域，建立與實現創新的照明方案：

- 晶圓級LED系統構裝(SiP)技術；
- 多用途光引擎；
- 引入式平面圖照明控制系統；及
- 移動物體辨認及運動感知系統。

Side emitting high-brightness light strips
側發光型高亮度條狀燈

MPT's LED Street Lamps were installed in major cities on the Mainland including Shenzhen, Guangzhou, Dalian, Xian, Shandong and Jiangsu
群組開發的LED路燈已於深圳、廣州、大連、西安、山東及江蘇等內地主要城市進行安裝測試



ASTRI's patented Tyre Pressure Monitoring System
應科院具有專利的胎壓監測系統

Advanced Packaging Technologies (APT) Programme

During the year, the APT Programme filed 14 patent applications and was granted two patents. It signed 13 industry contracts for technology dissemination, meeting the needs of micro-electronics packaging industry in Hong Kong and the Mainland. The following technologies were developed for commercialization.

- An innovative Design Adviser tool based mainly on measurement-proven numerical models and simulations was successfully developed and demonstrated for package-on-package (PoP) and through-silicon-via (TSV) fabrication and reliability-testing related processes. It was released to 33 companies including five cases of technology licensing;
- A fully functional prototype Tyre Pressure Monitoring System (TPMS) including four sensors and one receiver module was accepted by a tier-one semiconductor manufacturer;
- Prototype samples of both optical and signal-processing sub-modules for the pulse oximetry module were designed, fabricated and demonstrated. The sub-modules can be further integrated into various consumer electronics related products. This technology was licensed to a tier-one mobile phone manufacturer on the Mainland.

In addition, membership of the Advanced Packaging Technologies Consortium (APTC) has increased from 25 to 33. APTC provides a needed platform for supply chain companies in the advanced packaging industry, for not only networking, but also facilitating exchange of technology and business information.

Moving forward, the programme will continue to develop and strengthen its platform technologies especially in the area of 3D packaging. Meanwhile, product-oriented developments will be increasingly emphasized and deployed, including the commercialization of SiP-based TPMS, energy harvester for batteryless TPMS and consumer electronics, and modularized ubiquitous health care electronics.

先進構裝技術組

本年度先進構裝技術組申請了十四項專利，並已獲發兩項專利，另簽訂了十三份合同，進行技術授權，以滿足香港及中國內地微電子構裝業的需求。以下各項技術得以作商業化發展：

- 以量測驗證數值模型和模擬實驗為主要基礎，成功開發了極具創新性的設計顧問軟件，實現了疊層構裝（PoP）和矽通孔（TSV）的可靠測試。此軟件現已轉移予三十三家公司使用，其中五家獲技術授權。
- 提供胎壓監察系統的完整操作原型予一家知名的半導體生產商；每套系統包涵四個傳感器及一個接收器模塊。
- 用於脈衝血氧定量模塊的光學及訊號處理模塊的原型樣版，已完成設計、製造及示範，並將會進一步整合於各種消費性電子相關的產品上。這項技術已授權予中國內地一家一線的移動電話製造商。

此外，先進構裝技術聯盟的會員數目已由二十五增至三十三名。聯盟為先進構裝業供應鏈內的公司提供了一個互相聯系和交流科技與商業資訊的平台。

先進構裝技術組會繼續發展以及加強平台技術，尤其是三維構裝技術。另外，研發團隊也會著重產品開發和拓展，包括系統級構裝胎壓監察系統、用於無電池胎壓監察系統及消費性電子的能源節約器，及無處不在的模塊化醫療保健電子等。

The world's first Design Adviser Software Tool for 3D packaging design evaluation & optimization
世界上首個用於三維構裝設計評估及優化的設計顧問軟體工具

Portable Pulse Oximetry and Pulse Rate Measurement
便攜式脈衝血氧定量計及脈衝測量

Athlete checking his vital signs using a device powered by ASTRI's technologies after exercises
運動員於訓練後利用內置應科院技術的儀器檢測維生指數

Anti-shaking Compact Camera Module
防抖微型攝像模塊

Taking pictures with the world's smallest anti-shaking compact camera ensures good quality
利用全球最細小的防抖微型相機拍照，令拍攝效果有保證

Photonic Components (PC) Programme

During the year, the PC Programme filed ten patent applications and was granted five patents. It signed two industry contracts for technology dissemination.

The programme developed the world's first smallest anti-shaking compact-camera module for mobile phone applications. Auto-focus and anti-shaking functions were embedded in this 8.5x8.5x6.8 mm^3 camera module. With increasing popularity on 3D vision applications, the programme attracted a major company on the Mainland to jointly develop a 3D VCM-based anti-shaking digital camera. This product will be mass produced this summer. Sustaining leadership and strengthening technology profile, the programme is developing a 6x5.4x4 mm^3 wafer-level actuator for auto-focus function, which is a standard feature of camera phones today.

Meanwhile, the other focus is solar energy. With the team's expertise and capabilities, a promising solar energy development direction, the concentrating photovoltaic (CPV) technology has been identified. The ultimate goal is to convert solar energy into a more cost-effective energy source with 25 per cent or more modular efficiency.

光電子元件組

過去一年，光電子元件組申請了十項專利，獲批專利則有五項，另簽訂兩份技術轉移合約。

光電子元件組研發了全球首個最小巧，應用在手機的光學防抖微型攝像模塊，同時具備自動對焦和防抖兩項功能，而體積小至只有8.5x8.5x6.8立方毫米。隨著三維視像技術日益普及，光電子元件組與中國內地一家主要公司合作，共同開發以音圈馬達爲基礎的三維防抖動攝像機，產品將於本年夏季投產。為保持領導地位和加強技術領域，光電子元件組正在開發體積小至6x5.4x4立方毫米，用於自動對焦的晶圓級致動器，自動對焦技術是當今應用在手機攝像模塊的標準功能。

光電子元件組另一研發重點是太陽能，團隊憑藉專長和能力，確立了富有前景的太陽能研發方向，就是聚光式光電伏(CPV)技術。此研發項目的最終目標是將太陽能轉化為具成本效益的能源，並能達到百份之二十五以上的轉換效率。

The first ASTRI-made print head named China Head
應科院製造的第一台噴墨印頭，名為「中國頭」

Device Fabrications (DF) Programme

The DF Programme, the youngest in MPT, was established in 2009. During the year, it filed fourteen patent applications.

The programme carried out research projects related to "Green Device Technologies". One major achievement is the "China Head" - design and early development of China's first locally developed MEMS ink jet head for wide format printing, industrial marking and future printed electronics applications. The print head can be configured between 424dpi and 600dpi with a print swath up to 0.5 inch including 299 nozzles. The printing throughput is expected to be 50 per cent faster than comparable print heads of the same class in the market.

With the aim of providing high-powered LED wafer products catering to the demands for high efficacy LED light sources beyond 120 lumens per watt, the programme developed a unique process for high brightness LED sapphire substrate removal. It will continue to work on wafer-level processing integrating including epitexial processes, mirror forming, electrode forming, heat dissipation structure forming, sapphire removal and die-separation. Moreover, the programme has explored the feasibility of providing an inexpensive, long service hour lithium battery by using new and high capacity, high C-rate anode and cathode materials. It targets at implementing the new ASTRI anode and cathode materials passing battery fabrication processes to reach advanced specification of greater than 240Watt.hr per kg.

Last, but not least, a green project was conducted to explore the development of a low wind speed, wind energy collecting appliance using unique integrated ferrofluid bearing generator design of extremely low starting torque (more than two orders of magnitude lower than that of a ball bearing) and wind collector for household consumer electronics that require low DC voltage power.

器件研製組

器件研製組成立於二零零九年，是材料與構裝技術群組中最年輕的一支研發隊伍，去年該組申請了十四項專利。

器件研製組進行的研發項目主要是「綠色器件技術」。其中一項重要成果是「中國噴墨頭」，即中國首個自主開發的微機電技術噴墨打印頭的設計及早期研發，該技術可應用於寬幅印刷、工業刻印和電子印刷等方面。該打印頭有二百九十九個噴嘴，半英寸的列印寬度，其解像度可達四百二十四dpi至六百dpi之間。相對於市場上的同級產品，該打印頭的印刷產量預期會提升百分之五十。

為滿足市場對超過每瓦一百二十流明高效能LED光源的需求，以達到提供大功率LED晶圓級產品的目標，器件研製組研發了以剝離藍寶石襯底達至高亮度LED的獨特製作程式，並將繼續致力於整合外延生長，鏡面，電極形成，散熱結構製作，藍寶石剝離及晶片分離技術的晶圓級製作過程的研究。除此之外，器件研製組利用了嶄新的高電容及高功率的陰陽極材料技術，對低成本及高壽命的鋰電池的研發進行了可行性研究，目標是將應科院的陰陽極材料技術應用於電池的生產過程中，以達到每公斤能量超過二百四十瓦小時的標準。

另一綠色研發項目亦正在進行。該項目採用獨特的集成磁流體軸承發電機設計，利用起始力矩超低的特點(其力矩可低於滾珠軸承兩個等級)，研發一個低風速的風能採集裝置，為家用消費電子產品提供低電壓直流電源。

High-power vertical LED fabricated with proprietary chip structure design and ASTRI's novel sapphire removal technology
使用獨特結構設計及應科院獨有藍寶石去除技術的大功率垂直結構LED晶片

Achievements 成果

Income from industry during the year amounted to
本年度的業界收入總額為

$10.2

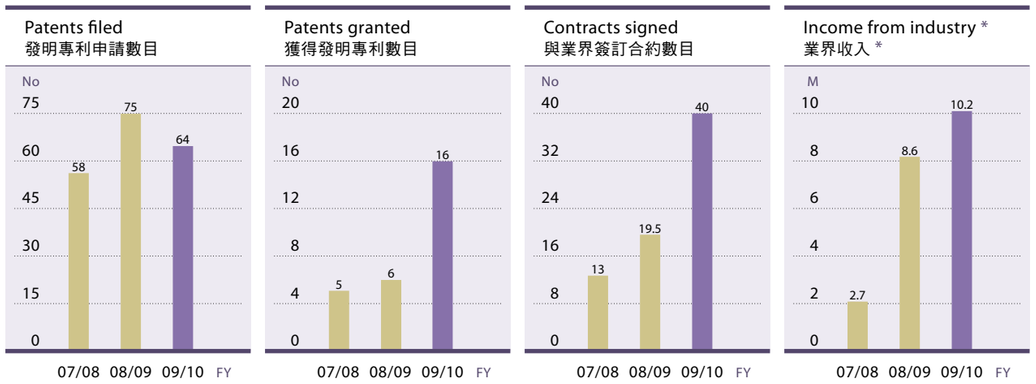
million (HK$)
百萬(港元)

In the year under review, MPT made remarkable achievements in terms of filed patents, technology transfers and income from industry.

Since establishment in 2005, MPT filed 262 patent applications and 28 patents have been granted. The accumulative number of technology transfers reached 85 generating over $22 million income from industry. As many as 30 companies have deployed MPT technologies through 50 licensing activities.

年度內，材料與構裝技術群組在申請專利、技術轉移和業界收入等方面，成績卓越。

自二零零五年成立以來，材料與構裝技術群組共作出二百六十二項專利申請，獲批二十八項專利；累積的技術轉移數目達八十五項，帶來業界收入共逾二千二百萬元；多達三十家公司已透過五十次授權，採用了群組開發的技術。



No number 數目 M million (HK$) 百萬(港元) FY fiscal year 財政年度
* received cash and in-kind 實收現金和物資資助

LED MR16 Lamps
LED MR16射燈

LED MR16 lamps with ASTRI's patented "birdcage" heat management technology are available in over 300 retail outlets worldwide
融合應科院專利「鳥籠」熱管理技術的LED MR16射燈在全球超過300家零售店有售

Industry Collaborative Project 業界合作項目
F Full Project 正式項目
S Seed Project 種子項目

Project Highlights 重點研發項目

	Project 項目	Description 內容	Duration 時期
	Display Systems (DS) Programme 顯示系統組		
F 1	Pico-projector 微型投影機	Develop miniaturized projection optical engine using solid state light module (LED/laser). The key parameters are: • Stand-alone projector and Integrated projection module (WSVGA 1024x600 or XGA 1024×768; brightness 20-40 lm; size <100cc; powered by battery); • Integrated projection module (WSVGA 1024x600 or XGA 1024×768; brightness 20-40 lm; size 15 cc; LED power <3-5W); and • Embedded projection module (WVGA 854×480; brightness 6-8 lm; size 4-6cc; LED power 1W). 開發以微顯示器搭配固態光源(發光二極管或鐳射)作爲投影源之微型投影機或模塊，重要參數為： • 獨立式投影儀(WSVGA 1024x600或XGA 1024x768、亮度20-40lm、尺寸<100cc、電池供電)； • 整合式投影模塊(WSVGA1024x600或XGA 1024x768、亮度20-40lm、尺寸15cc、LED功耗<3-5W)； • 嵌入式投影模塊(WVGA 854×480、亮度6-8lm、尺寸4-6cc、LED功耗1W)。	Mar 2009 to Jun 2010 二零零九年三月至 二零一零年六月
F 2	Flexible Adaptive Active Dynamic Backlight Control (FA-ADBC) ASIC [jointly developed with IC Design Group] 主動式動態LED背光控制ASIC開發 [與集成電路設計群組合作開發]	Implement ADBC FPGA IP into Si-IP ready form including FPGA-level optimization and market-ready Si-IP. 將主動式動態LED背光的FPGA IP轉化成Si-IP模式，包括優化FPGA層面及可推出市場的Si-IP。	Mar 2008 to Aug 2009 二零零八年三月至 二零零九年八月
F 3	Touch & Multi-touch Sensing System 觸控與多重觸控系統技術	Develop novel touch-sensing technologies for large-size LCD display, including low-cost touch sensing system and high performance multi-touch sensing system. 為大尺寸LCD平板顯示器開發創新的觸控技術平台，包括低成本觸控系統及高效能多重觸控系統。	Dec 2009 to May 2011 二零零九年十二月至 二零一一年五月

	Project 項目	Description 內容	Duration 時期
	LED Lighting (LL) Programme LED照明組		
F 4	Intelligent Outdoor Lighting 智能戶外照明	Develop three types of lamp heads for 8m, 10m and 12m street lamp application: • To adopt LED as light source to enhance product reliability and save energy; • Besides complying with IP66 dust/water-proof criteria, the design needs to incorporate the unique thermal management solution to keep LED at lower operating temperature; and • To integrate wireless control module with the lamp head to make use of the radio frequency transceiver to monitor the lamp status, which significantly saves energy and reduces maintenance cost. 開發三款燈頭以供八米、十米及十二米高的路燈應用。 • 採用LED作爲光源來開發更可靠及節能的燈頭； • 根據特殊的熱管理設計，燈頭可完全滿足IP66之防塵防水規範要求，並可提供優越的散熱表現，使LED可以低溫操作； • 整合無線控制模塊，使燈頭得以利用射頻收發裝置來進行監控，以提供更佳的節能控制，並有效降低維護成本。	May 2008 to Oct 2009 二零零八年五月至 二零零九年十月
S 5	Wireless CMOS Ambient Mapping Technology 無線CMOS環感映像技術	Adopt CMOS sensor with special design algorithm mapping the illumination condition in environment. • To simulate 3-D illumination condition with a 2-D image using CMOS sensor simulation tool; • To analyse intensity, colour temperature, etc., of the environment using simulated image; and • To make use of integrated RF transceiver to facilitate effective data transmission. 利用CMOS環感器作爲環感映像技術應用的評估。 • 以二維圖像及CMOS模擬傳感器來模擬三維照明狀況； • 利用模擬形象分析環境的光強及色溫等； • 利用集成射頻收發器，以便有效傳輸數據。	Mar to Sep 2009 二零零九年三月至 九月
S 6	Advanced Lighting Communication System 先進照明通訊系統	This project not only satisfies illumination function, LED light sources or luminaries, but also acts as the system platform for dual-way wireless data transmission. LED燈源或燈具除了滿足照明需求，亦可作為雙向無綫訊息傳遞使用之系統平台。	Jan to Jun 2010 二零一零年一月至 六月

Industry Collaborative Project 業界合作項目
F Full Project 正式項目
S Seed Project 種子項目

	Project 項目	Description 內容	Duration 時期
F 7	LED System-in-Package (SiP)/ Wafer-level LED SiP LED系統級構裝/晶圓級LED系統級構裝	Develop design and process platforms for fabricating the high thermal performance substrate. Develop the embedded passive and discrete active components based on a high thermal performance substrate. Develop SiP platform technologies by using active device embedded Si wafer as substrate and the embedded passive and bulk MEMS technologies. Apply the LED-SiP technologies to high-end flash module for personal mobile device application. 開發高散熱機能基板之設計及製作平台技術。以高散熱機能基板之設計爲基礎，搭配及整合嵌入式被動組件及使用分佈式主動組件。使用具備主動組件的矽晶圓爲基板，以增層嵌入式被動組件及微機電技術，開發SiP技術平台。將LED-SiP技術應用於高端閃光模塊以供個人流動裝置使用。	Nov 2009 to May 2011 二零零九年十一月至 二零一一年五月
	Advanced Packaging Technologies (APT) Programme 先進構裝技術組		
F 8	3D Packaging 三維構裝	Establish comprehensive reliability engineering technology platform including packaging design adviser, process, prototyping and characterization capabilities for 3D packages. Apply technologies developed for the design for reliability (DFR) & design for manufacturability (DFM) of package-on-package (PoP) and through-silicon-via (TSV) based 3D packages for various portable electronic products. 為三維構裝建立一個可靠性工程技術平台，包括構裝設計、工藝、樣品製作和測試。把相關的開發技術應用在各種移動電子產品，包括可靠性設計、可製造性設計、構裝堆疊及基於矽通孔的三維構裝。	Sep 2008 to Jun 2010 二零零八年九月至 二零一零年六月
S 9	Modularized Ubiquitous Healthcare Electronics (MUHE) 無處不在的模組化醫療保健電子	Develop the packaging technologies platform for modularized, reliable, low-power and miniaturized ubiquitous healthcare electronics. Develop total solution including system protocol/ algorithm and validated reliability test methodologies, certification and interoperability of products. 開發可靠性高、低功耗、小型化及模塊化的低成本醫療保健電子構裝技術平台。制定全面解決方案，包括系統協議／算法、可靠性測試方法、認證和產品互操作性。	Oct 2008 to Apr 2009 二零零八年十月至 二零零九年四月
S 10 F	Piezo-based Energy Harvesting 壓電式能量採集	Establish a platform for providing timely, cost-effective and reliable energy harvesting-related solutions particularly for portable electronics such as: • Energy harvester(s); • Energy storage; and • Product-oriented system development including hardware and software applicable for portable electronics, such as consumer electronics, medical and automotive products/ applications. 建立技術平台，提供及時、經濟及可靠的能量收集方案，以應用於可攜式電子產品。 • 能量採集器設計； • 能量儲存電路設計； • 產品導向系統開發，包括適用於可攜式電子產品，如消費電子、醫療電子及汽車電子等的軟硬件開發。	S Mar to Aug 2009 二零零九年三月至八月 F Jan 2010 to Jun 2011 二零一零年一月至 二零一一年六月
F 11	Ceramic-based System in Package (SiP) 使用陶瓷基板的系統級構裝	Develop and demonstrate a low-cost solution including design, analysis, characterization, process integration, volume manufacturing capabilities and reliability by using warpage controlled ceramic substrates. Next-generation wireless and portable electronics, such as 802.11 a/b/g, are used as test vehicles. Develop and implement product vehicles such as RF Front-end Module (RF-FEM) for ultra-thin WLAN module including high-performance substrate, embedded passives, PA module, matching networks, IPDs and EMI shield. 採用翹曲度控制陶瓷基板研發低成本方案，包括設計、特性分析、工藝的整合、可量產性及可靠性評估。下一代無線和可攜式電子產品，如802.11a/b/g將用作測試載具。以射頻前端模塊(RF-FEM)作為載具製作的超薄無線局域網模塊，包括高性能基板嵌入式被動組件、功率放大器模塊、匹配網絡，整合被動組件以及電磁屏蔽。	Aug 2007 to Jun 2009 二零零七年八月至 二零零九年六月
12	Tyre Pressure Monitoring System (TPMS) 胎壓監測系統	Develop technologies for compact dimensions, low-cost and reliable TPMS. Adopt the wireless, packaging technologies and software protocol to provide high-performance and low-power consumption solutions for TPMS. Explore potential solutions for "batteryless" technology appropriate for TPMS and other products and applications. 開發體積小、成本低和可靠的胎壓監測系統的相關技術。採用無線電、構裝技術和軟件協同制式等技術，來提供高性能、低耗電的胎壓監測系統方案。探索“無電源”技術方案以供胎壓監測系統及其他產品應用。	May 2008 to Jan 2011 二零零八年五月至 二零一一年一月

Industry Collaborative Project 業界合作項目
F Full Project 正式項目
S Seed Project 種子項目

	Project 項目	Description 內容	Duration 時期
	Photonic Components (PC) Programme 光電子元件組		
F 13	Anti-shaking Compact Camera Module (CCM) 照相手機的防抖動技術	Develop an Anti-shaking CCM at a size as small as 8.5x8.5x6.8mm^3 with: • Auto-focus function; • 3M pixels or 5M pixels; and • Mass producible turn-key solution. 研發尺寸小至只有8.5x8.5x6.8立方毫米的防抖動微數碼相機模塊，包括： • 自動對焦功能； • 3M或5M像素； • 完整的量產方案。	May 2008 to Dec 2009 二零零八年五月至 二零零九年十二月
F 14	Wafer Level Chip Scale Actuator 晶圓級相機致動器	Develop wafer level chip scale actuator with; • Low cost (<USD0.3); • Compact size as small as 6x5.4x4mm^3; and • 1.3M, 2M, 3M or 5M pixels. 研發晶圓級相機致動器： • 低成本（<0.3美元）； • 結構緊密（尺寸小至6x5.4x4立方毫米）； • 1.3M、2M、3M或5M像素。	Mar 2010 to Aug 2011 二零一零年三月至 二零一一年八月
	Device Fabrications (DF) Programme 器件研製組		
F 15	Novel CMP for Solid-state Lighting Power GaN LEDs (DF) 用於大功率固態照明GaN LED的新型CMP方法	Develop a platform technology for fabricating power GaN LED chips by adopting a special CMP method to remove sapphire substrate. 開發應用於製造大功率GaN LED晶片的新型藍寶石剝離CMP方法。	Feb 2008 to Sep 2009 二零零八年二月至 二零零九年九月
F 16	Integrated Vertical LED Technology 垂直LED技術集成	Integrate two major phases in power GaN chip design and fabrication: • Epitaxial wafer design; and • Chip fabrication with sapphire substituted by a new metal host. 集成大功率GaN LED晶片的設計和製造的兩個關鍵環節： • 外延片設計；及 • 以新的金屬基板代替藍本寶石製造晶片。	Feb 2010 to Jul 2011 二零一零年二月至 二零一一年七月
F 17	Thermal Energy Management with Advanced Materials and Structures (TEMA) 先進材料和結構的散熱管理	Develop and implement solution for products that need an excellent heat dissipation module such as automobile forward lighting and high-power density communication devices, using more advanced structural design and integrate with material technology. 此項目是針對需要良好散熱的商品，如汽車轉向燈和高功率通訊設備等，運用先進的結構設計，結合材料科技來開發先進散熱管理模塊。	Dec 2007 to Dec 2009 二零零七年十二月至 二零零九年十二月
S F 18	MEMS Bi-axial Scanning Mirror for Solid-state Light Engines 應用於固態光源引擎的微機電二維微掃描鏡片	Establish MEMS device design platform ready for foundry production through: • Specific MOEMS device; • Package & system integration development (scanning mirror). It can be applied to imaging devices - HUD, HMD, pico-projector, etc; and other application specific devices – bar code scanner, tracking system, laser printers and touch-screen, etc. 透過以下兩項技術，建立微機電器件的設計平台，給代工廠量產： • 獨特的微光機電裝置； • 系統與構裝整合的開發（微機電掃描鏡片）。 此微機電裝置可應用於影像設備，如平視顯示器（HUD）、頭戴顯示器（HMD）、微型投影機等；及其他特殊應用裝置，如條碼掃描機、追踪系統、鐳射打印機，以及手觸屏幕等。	S Jan 2008 to Jun 2009 二零零八年一月至 二零零九年六月 F Oct 2009 to Mar 2011 二零零九年十月至 二零一一年三月
S 19	MEMS Ink Jet Head for Wide-Format Printing 用於寬幅打印機的微機電噴墨印表頭	Establish MEMS device design platform ready for foundry production through: • Specific MEMS device; • Package & system integration development (ink jet head). It can be applied to wide-format printing, industrial marking and general printing, etc.; other application specific devices – printed electronics, digital fabrication, flexible electronics, display panels, solar panels and energy cells, etc. 透過以下兩項技術，建立用於代工廠量產的微機電系統裝置設計平台： • 獨特的微機電裝置； • 系統與構裝整合的開發（噴墨印表頭）。 此微機電裝置可應用於寬幅打印、工業市場應用及一般消費打印裝置；其他特殊應用，如印刷電子、數碼製造、軟性電子、顯示面板、太陽能面板及能源組件等。	Jul to Dec 2009 二零零九年七月至 十二月
F 20	Next-generation Anode-material for Li-ion batteries (NALI) 新一代鋰電池陽極材料	Develop low-cost anode-material which fits right into the high energy capacity range (350~450mAmphr/g) and safely performs high C-rate with long cycle-life for the next-generation Li-ion-battery. ASTRI developed the unique nano-structure anode-material which can enter markets easily and fulfil the requirement of industrial battery packaging process. 研發低成本的陽極材料，以滿足新一代鋰電池對高電容量密度（350~450 mAmphr/g）的要求，並達到安全與長壽命快速充放電的效果。應科院新研發的納米結構陽極材料，符合工業電池構裝製程的要求，容易獲市場採納。	Oct 2008 to Sep 2010 二零零八年十月至 二零一零年九月

Therapeutic Temperature Regulation Mattress
溫度調節治療床墊

An innovative mattress that maximizes user's comfort by its effective cooling and warming as well as therapeutic characteristics
一款設計創新的床墊，不但可以製冷和加熱，同時兼具治療作用，為用家帶來最舒適的感受

Bio-Medical Electronics Team
生物醫學電子組

Although BME is only one-year old and is operating under limited budget and human resources, it has made good progress and filed four patent applications.
生物醫學電子組才剛成立一年，在有限的人力資源及預算之下，仍然進展良好，其間申請了四項發明專利。

ASTRI took the initiative of establishing the Bio-Medical Electronics (BME) Team in April 2009 providing local industry with value-added bio-medical application technology. Although BME is only one-year old and is operating under limited budget and human resources, it has made good progress and filed four patent applications.

During the fiscal year, BME focused on developing Magnetic Resonance Imaging (MRI) and Magnetic Resonance Electrography (MRE) technologies, initiating a couple of bio-medical-related projects including MRI, MRE, Thermal Therapy Apparatus and Device (TTAD) for surgical applications, Amblyopia Treatment System (ATS), and Training Equipment and Procedure for Brain-vision Training Device (BTD).

應科院於二零零九年四月成立生物醫學電子組，目的是為本地業界提供增值的生物醫學應用技術。生物醫學電子組才剛成立一年，在有限的人力資源及預算之下，仍然進展良好，其間申請了四項發明專利。

年度內，生物醫學電子組重點研發磁共振成像及壓電陶瓷磁共振彈力成像驅動器技術，並展開一系列與生物醫療相關的項目，包括磁共振成像(MRI)、壓電陶瓷彈性成像驅動器系統(MRE)、外科應用的熱治療儀及設備(TTAD)、弱視治療系統(ATS)，及視覺通路訓練系統(BTD)的訓練儀器及程式。

Review 回顧

Low Field MRI Machine
低場磁共振成像機

First in the world to develop superconducting radio frequency coils for low field MRI system
開發全球首個利用超導射頻線圈的低場磁共振成像系統

BME projects focus on three key areas. In Magnetic Resonance Imaging, BME cooperated with a local company in developing the first low field MRI system (0.3T) in Hong Kong. The team pioneered the use of High Temperature Superconducting coils in MRI and became the first in the world to develop superconducting radio frequency coils that could overcome the resolution limit of conventional copper coils. It improved imaging resolution significantly by 200-500 per cent without commensurately increasing the magnetic field strength. Since the launch of this project, $3.26 million and $1.36 million have been received from industry partners and ITF respectively.

The second key area is Magnetic Resonance Elastography, a medical screening system using magnetic resonance imaging to examine stiffness or elasticity of human organs. The main MRE applications are to detect early cirrhosis of the liver and Alzheimer's disease, which require measuring stiffness or elasticity characteristics of tissues.

In the past year, BME developed the prototype system and used it to carry out preliminary clinical trials in several teaching hospitals on the Mainland. BME is now preparing to start the $15 million platform project and it targets for a 12 per cent ($1.8 million) contribution from industry partners.

The third key area is Neuro Electronics (NET) which includes Amblyopia Treatment System, and Training Equipment and Procedure for Brain-vision Training Device. These projects are to develop a highly integrated medical goggle system embedded with advanced brain-vision training programmes with binocular control and variable viewing distance promoting home-based eye care, as well as the concept of brain-vision training, for treating visual problems.

生物醫學電子組有三個重點研究領域，第一是磁共振成像(MRI)。生物醫學電子組與本地一家企業合作開發香港第一個低場磁共振成像系統(0.3T)。該項目團隊率先使用高溫超導材料於磁共振成像上，成為全球首個利用超導射頻線圈，來解決傳統銅線圈的解像度限制的研究項目。在沒有增加磁場的情況下，該技術能明顯改善成像解像度達百分之二百至五百。此項目由開始至今，獲業界投入資金合共三百二十六萬元，也獲得創新及科技基金撥款一百三十六萬元。

第二個重點研究領域是壓電陶瓷彈性成像驅動器系統。MRE是一種利用MRI檢查人體器官剛性或彈性的健康檢查系統，主要應用於需要測量人體組織的剛度或彈性特徵的疾病，例如早期肝硬化與早期老年癡呆症的診斷。

過去一年，生物醫學電子組已成功開發了系統原型，並開始在內地幾所教學醫院進行初步的臨床試驗。生物醫學電子組現正準備展開平台項目，總預算為一千五百萬元，並預計可從業界獲得資金一百八十萬元，佔總預算的百分之十二。

第三個重點研究領域是神經電子，項目包括弱視治療系統及視覺通路訓練系統的訓練儀器及程式。這些項目的研究目標是開發高度集成的醫療護目鏡，加入先進的大腦視覺訓練程式，控制和調節雙眼的視覺距離，以推廣家庭式的眼科保健及配合大腦視覺訓練治療來改善視力問題。

BME completed two seed projects and became the first team in the world to develop an interactive treatment programme and device for amblyopia patients. The project has generated strong interests from local and overseas industries in the programme and product, and consequently BME signed a Memorandum of Understanding with Biowave Technology Limited, which will contribute in-kind and cash towards the platform project next year. BME hopes the amblyopia team can spin off in the near future and the final product be commercialized.

Under the Industry Collaborative Project (ICP) scheme, BME signed a collaborative contract with local Advanced Materials Enterprises Company Limited (AME) to develop Thermal Therapy Apparatus and Devices. At the same time, ITF approved $0.84 million funding for developing thermal therapy medical devices. Using its engineering expertise, BME during the year completed the project using only $0.66 million of the $0.86 million income from industry.

Meanwhile, BME licensed two U.S. patents to AME. They jointly developed three TTAD prototypes which proved promising and applicable, encouraging AME to seek medical regulatory approval and commercialization. The deployment of thermal therapy technology provides patients with a more effective and efficient environment in their surgery and recovery stages.

生物醫學電子組完成了兩個種子項目，開發了全球首創的互動弱視治療程式和設備。項目引起了很多來自本地及海外業界對治療程式和產品的關注及查詢。中港大富生物波科技有限公司與應科院已簽訂合作備忘錄，協議在下一個財政年度為有關項目投入資金及物資。生物醫學電子組預期此技術可以在不久將來被分拆及商業化。

在業界合作項目方面，生物醫學電子組與本地公司高新材料企業(AME)簽署合同，合作開發外科應用的熱治療儀及設備。此項目同時獲創新及科技基金批出八十四萬元作為發展經費。生物醫學電子組憑專業知識和經驗，年度內成功完成了該項目，在來自業界的八十六萬元資金當中只用了六十六萬元。

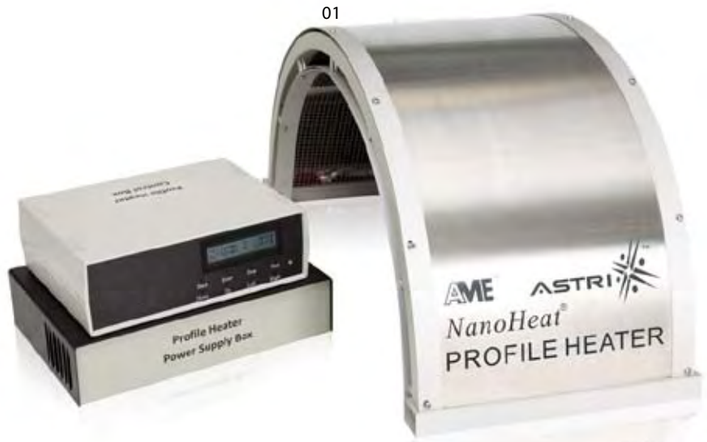
生物醫學電子組將兩項技術專利授權予AME，雙方合作研發出三組可靠和實用的外科應用熱治療儀及設備原型。以上成果促使AME申請醫療管理部門批准將這項技術商業化。熱治療技術的成功使用為病人提供了合適環境，有助他們輕鬆渡過手術和康復階段。

During the year, BME filed
本年度，生物醫學電子組已提交

4

patent applications
項專利申請

01



02

01 Prototype of Thermal Therapy Apparatus and Devices for Surgical Applications
外科應用熱治療儀及設備原型

02 Prototype of Therapeutic Temperature Regulation Mattress
溫度調節治療床墊原型

Developments and Achievements 發展及成果

	2009/10
No. of patents filed 發明專利申請數目	4
Income from industry (received cash and in-kind) 業界收入 (實收現金及物資資助)	2.4 million (HK$) 百萬(港元)

BME specializes in performing focused and high quality R&D in bio-medical electronics for technology transfer to industry. It also aims at fulfilling the mission of establishing Hong Kong and the Pearl River Delta as a leading international centre for bio-medical electronics. Currently, BME focuses its R&D on three KTIs including Magnetic Resonance Imaging, Neuro Electronic and Thermal Therapy Device. In the coming year, BME will continue expanding research items in existing KTI and develop a new KTI in Tele-healthcare area.

In the coming year, BME will kick off three platform projects: Palpategram, Multiple Function Brain Training Device and MRI Incubator. Many companies already expressed interest in these technologies by fully supporting in cash and in-kind contributions towards the projects. BME plans to license the technologies to industries in both exclusive and non-exclusive ways, and expects commercialization by licensing or spin-off.

To further develop the team, BME will continue attracting talents who are interested in R&D of bio-medical electronics. BME will also hold forums, workshops and seminars to exchange ideas with industries and universities and keep abreast of the latest technologies.

During the year, BME received
本年度，生物醫學電子組獲業界投入資金

$2.4
million income from industry
百萬元

生物醫學電子組重點研發專業和高品質的生物醫療電子技術，然後將研發成果轉移給業界。其使命是要建立香港和珠三角成為一個領先的國際生物醫學電子中心。目前，生物醫學電子組的重點研發領域有三項，包括磁共振成像、神經電子和熱治療儀。在未來一年將繼續擴大現有的技術研究項目，並發展新的技術領域—遠程醫療。

生物醫學電子組來年將展開三項平台項目：彈性成像儀、多功能大腦訓練儀及弱視治療、磁共振成像培養器。目前已有多家公司對這些技術表示有興趣和支持，並已為項目投入現金及物資資助。生物醫學電子組計劃以獨家和非獨家的方式，通過專利授權或企業分拆形式將技術轉移給產業界。

Rapid Prototyping Machine
快速成型機

展望未來，生物醫學電子組將繼續吸引更多對生物醫療電子有興趣的人才加入其研發行列。生物醫學電子組來年將舉行論壇、工作坊和研討會，與業界和大學進行交流，掌握最新的生物醫學技術資訊。

Portable Medical Goggle System
便攜式醫療護目鏡系統

With a portable medical goggle system, amblyopia patients can receive binocular vision training at home or anywhere anytime
有了便攜式的醫療護目鏡系統，弱視病人可以安坐家中，或隨時隨地接受雙眼立體視覺訓練

Project Highlights 重點研發項目

Industry Collaborative Project 業界合作項目
Seed Project 種子項目

	Project 項目	Description 內容	Duration 時期
1	Thermal Therapy Apparatus and Devices (TTAD) for Surgical Applications 外科應用的熱治療儀及設備	The project is to design and develop economical, practical and high performance apparatus to maintain core body temperature at 36±0.5 ºC in surgery for preventing preoperative and postoperative hypothermia, morbid cardiac events, blood loss, shivering and allergenic blood transfusions as well as its associated risks by using the core technology of Advanced Multi-Layered Nano-Thickness Coating Material developed by AME. 此項目是設計和研發經濟實用和高性能的外科手術熱治療儀器，維持體溫在36±0.5ºC範圍內，以防止外科手術時因低溫而導致傷口感染、心臟病、失血過多、顫抖、輸血過敏反應及相關併發症等。此儀器採用了由高新材料企業開發的先進多層次的納米厚度塗層物料。	Sep 2008 to Feb 2010 二零零八年九月至二零一零年二月
S 2	Piezoelectric MRE Driver System (PMREDS) 壓電陶瓷彈性成像驅動器系統	Test piezoelectric MRE driver system in phantom and human subjects and modify according to results of human subjects. The final PMREDS will provide easy set-up and use, as well as good reliability, durability, sensitivity and less attenuation without any artifact in humans. Specially designed to combine three major equipment (pulse generate, pulse amplifier and pulse oscilloscope) into one, for easy handling. 在模型和人體上測試壓電陶瓷彈性成像驅動器系統，並根據人體實驗結果進行改進。此系統易於安裝及使用，可靠、耐用、靈敏度高，在人體上沒有副作用。設計特色是將三個主要儀器包括波形製造器、放大器及示波器結合成一體，方便攜帶。	Apr to Oct 2009 二零零九年四月至十月
S 3	Amblyopia Treatment System (ATS): Training Equipment and Procedure 弱視治療系統：訓練儀器及程式	Develop a high fidelity visual display system for amblyopia (lazy eyes) training which can be used at home, hospital or outdoor. 開發一套高度逼真的視覺顯示系統，為弱視病人提供訓練軟件程式，可在家中、醫院及戶外使用。	Feb to Aug 2009 二零零九年二月至八月
S 4	Therapeutic Temperature Regulation Mattress (TTRM) 溫度調節治療床墊	Design and develop an innovative mattress which provides not only effective cooling and warming to maximize user's comfort, but also meets the highest energy saving and hygienic standards with therapeutic characteristics. 正在設計和開發的新款床墊，不但可以提供有效冷卻和升溫，為用者帶來舒適感受，而且也具備節能、衛生和療效等特性。	Aug 2009 to Dec 2010 二零零九年八月至二零一零年十二月
S 5	Brain-vision Training Device (BTD) 視覺通路訓練系統	Design and develop a stand-alone goggle device for any vision treatment software with re-programmable chip and individual battery for portable use. The training programme will be modified with a user-friendly interface, music and cartoon to appeal to children. 設計和開發一個獨立視覺治療護目鏡，適用於任何眼治療程式，內置可重編程序的電子晶片和個別電池，方便攜帶使用。訓練軟件經改良後，用戶界面更易使用，並且加入音樂和動畫，吸引兒童使用。	Dec 2009 to Jun 2010 二零零九年十二月至二零一零年六月
S 6	Magnetic Resonance Imaging Incubator (MRII) 磁共振成像培養器	Develop an all-functional MRII with the following innovative features: • Automatic control and display interface connecting all the life sustaining equipment and vital sign monitoring equipment for patient; • Custom designed copper RF receiver coils for improving signal-to-noise ratio (SNR) to achieve faster scanning or better images; • High Temperature Superconductive (HTS) coils for improving SNR in low field MRI, enabling infant MRI to be performed at a fraction of current cost; and • Safe and reliable cryostat for cooling HTS coils with maximum patient safety. 開發一個具有以下特點的全功能磁共振培養器： • 綜合性的自動監控介面，提供一切重要生命及環境參數； • 採用特製的高性能銅製接收線圈，以提高訊噪比，能縮短掃描時間或提高影像質素； • 使用高溫超導體線圈，以提高訊噪比，在為嬰兒進行低場磁共振系統掃描時節省成本； • 利用低溫容器冷凍高溫超導體線圈，安全可靠。	Dec 2009 to Jun 2010 二零零九年十二月至二零一零年六月

Hong Kong Jockey Club Institute of Chinese Medicine
香港賽馬會中藥研究院

Under the strategy of innovation and technology development, HKJCICM acts as a focal point of contact and coordination among various stakeholders including Government, industry, academia and research institutes to assist the development and promotion of the modernisation of Chinese medicine in Hong Kong.

在創新科技策略下，香港賽馬會中藥研究院的使命是成為香港中藥業的聯絡與協調中心，促進政府、產業、學界及研究院的合作，推動本港中藥現代化的發展。

The Hong Kong Jockey Club Institute of Chinese Medicine (HKJCICM) was set up by the Hong Kong SAR Government in partnership with The Hong Kong Jockey Club as an ASTRI subsidiary. It is governed by a separate Board of Directors and receives a HK$500 million pledged donation from The Hong Kong Jockey Club Charities Trust for researching and developing Chinese medicine (CM).

Under the strategy of innovation and technology development, the institute acts as a focal point of contact and coordination among various stakeholders including Government, industry, academia and research institutes to assist the development and promotion of the modernisation of CM in Hong Kong.

香港賽馬會中藥研究院（研究院）由香港特別行政區政府和香港賽馬會合作成立，為香港應用科技研究院的附屬機構。研究院的發展策略和業務由獨立董事局監督，並獲香港賽馬會慈善信託基金承諾捐款五億港元，支持中藥科研和發展計劃。

在創新科技策略下，研究院的使命是成為香港中藥業的聯絡與協調中心，促進政府、產業、學界及研究院的合作，推動本港中藥現代化的發展。

Developments and Achievements 發展及成果

HKJCICM's development strategies in advancing quality control and standardization of CM, championing CM and herbal product innovations, and providing sector-relevant information and exchange are geared for the institute to connect with the CM sector and achieve added value.

Through governance, projects, partnership and exchange, HKJCICM gained experience and made impressive progress:

- 26 publications
- Seven granted patents
- A central CM Laboratory with technical competency and productivity in authentication, plant chemistry, analytical development and quality control to support funded projects and industry initiatives, and provision of technical services, research tools and information for better quality control and standardization of CM;
- R&D and production of chemical markers which are accepted by the Chinese Medicine Council of Hong Kong for testing purpose to support product registration. About 216 markers are available for sale up to early 2010, each chemical marker is accompanied with a certificate of analysis including purity (e.g. 95 per cent or 98 per cent);
- A showcase on integrative Chinese and Western medicine research on Irritable Bowel Syndrome -- a drug product in pre-clinical development;
- A central business development platform to facilitate technology transfer and commercialization;
- A "Chinese Medicine Hong Kong" information and exchange platform, including e-news portal, market research, publications, forums and exhibitions;
- Publication of the English version of the Encyclopedia on Contemporary Medicinal Plants, a four-volume set comprising more than 800 individual medicinal plants. The reference value of the book is acknowledged by many local, Mainland and overseas experts and professionals; and
- Five public lectures to strengthen networking with industry, disseminate R&D updates and explore new projects ideas.

在發展策略方面，研究院繼續保持與中藥業界的緊密合作，致力提升中藥品質控制及標準化；推動創新中藥及天然產品的研發；及發放業界相關資訊、促進相互交流。

研究院透過統籌協調、項目管理、合作及交流，獲取了寶貴經驗，進展令人鼓舞：

- 發表了二十六篇學術論文；
- 取得七項專利；
- 發展具研究實力及生產力的中藥實驗室，提供中藥材鑒定、成份檢測、分析方法、質量控制等，以支持研究院推動之項目及業界發展需要；中藥實驗室還提供技術性服務、研究工具及資訊等，來加強中藥質量控制及標準化；
- 研究及生產化學對照品，直至二零一零年年初為止，已有約二百一十六個品種可供銷售，每個產品均附有列明純度（如百分之九十五或百分之九十八）等資料的分析證書。有關對照品已獲香港中醫藥管理委員會中藥組接納用作藥品測試，以支持產品進行註冊；
- 研製治療腸易激綜合症藥物，作為中西醫學結合研發試點，該藥物已進入臨床前研究階段；
- 設立業務發展平台，推動技術轉讓及研發成果商業化；
- 設立名為「中藥．香港」的資訊及交流平台，涵蓋新聞、市場研究、刊物、論壇及展覽等方面的資訊；

- 出版一套四冊的英文版《當代藥用植物典》，內容涵蓋八百多種常用藥用植物，是一套極具價值的參考書，備受海內外專家學者的推介及好評；

- 舉辦了五個公開講座，以加強與業界聯繫、分享研發新知及發掘新項目意念。

Finance
財務報告

Finance
財務報告

Overview
概況

During FY2009/10, ASTRI continued to be prudent in its financial management. In brief, the income and expenditure for the year amounted to HK$424,176,748 and HK$418,567,383 respectively, resulting in a surplus of HK$5,609,365.

During the year, ASTRI received HK$123,106,000 from recurrent subvention (RS), of which HK$121,862,660 was recognised as income. In the same period, ASTRI also received HK$247,135,191 from ITF project funds and HK$4,129,155 from ITF internship fund. The industry contribution directly attributable to R&D projects amounted to HK$25,674,121 for FY2009/10. Meanwhile, the other income received from the industries also increased from HK$12,382,412 in FY2008/09 to HK$16,383,548 in FY2009/10.

The total expenditure of RS amounted to HK$116,466,946. The full year RS expenditure comprised mainly:

(a) HK$69,342,988 in respect of salaries and related benefits;
(b) HK$16,879,663 in respect of office rental and related building management fees;
(c) HK$10,299,953 in respect of patent expenses and other professional fee;
(d) HK$3,976,310 in respect of commercialisation and PR activities; and
(e) HK$15,968,032 in respect of ASTRI's other operating expenses.

The total expenditure of the R&D projects amounted to HK$272,809,312, which represented the actual cash outflow incurred during the year for 67 full projects and 40 seed projects. Meanwhile, the internship expenditure amounted to HK$4,129,155, which represented the actual cash outflow of salary payments for interns engaged in 30 full projects.

During the year, HK$4,554,692 was refundable to the Government, included of which, HK$4,149,705 was guarantee royalty income received from licensee. An additional amount of HK$92,556, which represented the amount of bank interest generated from completed ITF projects, was refunded to the Government.

The consolidated statements for the year ended 31 March 2010 of ASTRI and its subsidiary, Hong Kong Jockey Club Institute of Chinese Medicine Limited, have been audited by the external auditor with a clean audit opinion and an extract of the Consolidated Statement of Comprehensive Income and Consolidated Statement of Financial Position are set out on the following pages.

應科院在二零零九／一零年度，繼續以審慎的態度執行財務管理。本年度總計，收入和支出總額分別為港幣424,176,748元及港幣418,567,383元，盈餘達港幣5,609,365元。

年度內，應科院收到經常性撥款港幣123,106,000元，其中港幣121,862,660元被列作收入。同期，來自創新及科技基金的研發經費港幣247,135,191元，及來自創新及科技基金的實習研究員計劃資助港幣4,129,155元。二零零九／一零年度業界直接投入研發項目的資金合計港幣25,674,121元。同時，從業界所得的其他收入由二零零八／零九年港幣12,382,412元增加至二零零九／一零年港幣16,383,548元。

經常性撥款的總支出達港幣116,466,946元，全年經常性撥款開支主要包括：

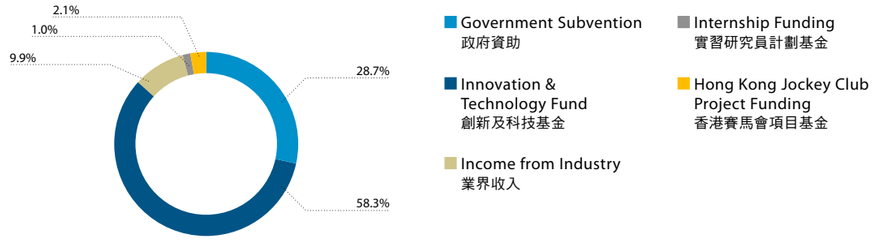
(a) 港幣69,342,988元薪酬及有關福利的支出；
(b) 港幣16,879,663元辦公室租金及有關辦公室管理費的支出；
(c) 港幣10,299,953元有關專利費及其他專業服務費的支出；
(d) 港幣3,976,310元有關商業化及推廣活動的支出；
(e) 港幣15,968,032元有關應科院其他營運方面的支出。

研發項目的總開支達港幣272,809,312元，相當於六十七個正式項目和四十個種子項目的實際流出現金支出。同時，實習研究員計劃開支達港幣4,129,155元，相當於從事三十個正式項目的實習研究員薪酬的實際流出現金。

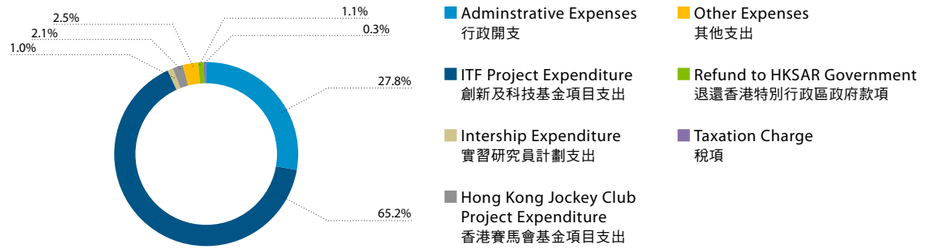
年度內，應科院可退還給政府港幣4,554,692元，當中包括從獲技術授權者所得港幣4,149,705元保證版稅收入。另有港幣92,556元，是從完成了的創新及科技基金項目所得的銀行利息收入，已退還給政府。

應科院及其附屬機構香港賽馬會中藥研究院有限公司全年截至二零一零年三月三十一日止的綜合帳目經由外部核數師審計，並獲發無保留審計意見書。綜合全面收益表及綜合財務狀況表詳載於後頁。

2009/2010 Income Pecentage
二零零九／一零年度收入百分比



2009/2010 Expenditure Pecentage
二零零九／一零年度支出百分比



Consolidated Statement of Comprehensive Income
綜合全面收益表

(For the year ended 31 March, 2010 截至二零一零年三月三十一日止年度)

		2010 (HK$) 二零一零年(港幣)	2009 (HK$) 二零零九年(港幣)
Subvention	**資助**		
Income from Government subvention	政府資助收入	121,862,660	121,386,000
Administrative expenses	行政支出	(116,466,946)	(100,106,394)
Surplus on subvention	資助盈餘	5,395,714	21,279,606
Project Funding from Innovation and Technology Fund and Industry Contribution	**創新及科技基金及業界項目資金**		
Project fund income	項目收入		
Innovation and Technology Fund	創新及科技基金	247,135,191	211,378,033
Industry contribution	業界項目資金	25,674,121	27,217,833
Project expenditure	項目支出	(272,809,312)	(237,795,866)
Balance on project funding	項目資金餘額	-	800,000
Internship Funding from Innovation and Technology Fund	**創新及科技基金的實習研究員計劃基金**		
Internship fund income	實習研究員計劃資助收入	4,129,155	163,061
Internship expenditure	實習研究員計劃支出	(4,129,155)	(163,061)
Balance on internship funding	實習研究員計劃資助餘額	-	-
Project Funding from the Hong Kong Jockey Club	**香港賽馬會項目基金**		
Project fund income	項目資助收入	8,992,073	10,528,265
Project expenditure	項目支出	(8,992,073)	(10,528,265)
Balance on project funding	項目資助餘額	-	-
Other Net Income	**其他淨收入**		
Other income	其他收入	16,383,548	12,382,412
Other expenses	其他支出	(10,525,036)	(10,521,576)
Other net income	其他淨收入	5,858,512	1,860,836
Amount Refund to the Government of Hong Kong Special Administrative Region	**退還香港特別行政區政府款項**	(4,554,692)	(13,229)
Surplus Before Taxation	**稅前盈餘**	6,699,534	23,927,213
Taxation Charge	**稅項**	(1,090,169)	(5,426,157)
Surplus for the Year	**本年度盈餘**	5,609,365	18,501,056
Other Comprehensive Expense	**其他全面支出**		
Exchange difference arising on translation	外幣報表換算差額	(355)	(20)
Surplus and Total Comprehensive Income for the Year	**本年度盈餘及全面總收入**	5,609,010	18,501,036
Surplus for the Year Attributable to	**本年度盈餘分配於**		
Owners of the Company	公司擁有人	5,594,084	18,468,842
Minority interests	少數股東權益	15,281	32,214
		5,609,365	18,501,056
Total Comprehensive Income for the Year Attributable to	**本年度全面總收入分配於**		
Owners of the Company	公司擁有人	5,593,729	18,468,822
Minority interests	少數股東權益	15,281	32,214
		5,609,010	18,501,036

Consolidated Statement of Financial Position
綜合財務狀況表

(At 31 March, 2010 於二零一零年三月三十一日)

		2010 (HK$) 二零一零年(港幣)	2009 (HK$) 二零零九年(港幣)
Non-current assets	**非流動資產**		
Property, plant and equipment	物業，機器及設備	15,673,334	8,793,273
Current assets	**流動資產**		
Accounts and other receivables	賬戶及其他應收款項	10,374,421	6,613,347
Bank balances and cash	銀行結餘及現金	225,894,644	212,457,114
		236,269,065	219,070,461
Current liabilities	**流動負債**		
Accounts and other payables	賬戶及其他應付款項	33,681,524	22,518,800
Receipts in advance	預收款項	131,786,511	128,394,631
Amount due to the Government of Hong Kong Special Administrative Region	香港特別行政區政府到期款項	4,655,721	180,013
Amount due to The Hong Kong Jockey Club	香港賽馬會到期款項	2,627,511	2,184,485
Tax liabilities	應付稅項	-	2,094,579
		172,751,267	155,372,508
Net current assets	**流動資產淨值**	63,517,798	63,697,953
Total assets less current liabilities	**總資產減流動負債**	79,191,132	72,491,226
Non-current liabilities	**非流動負債**		
Deferred taxation	遞延稅項	(2,531,156)	(1,440,260)
Net assets	資產淨值	76,659,976	71,050,966
Capital and reserves	**股本及儲備**		
Share capital	股本	2	2
Accumulated surplus	累計盈餘	76,612,853	71,018,769
Translation reserve	折算儲備	(375)	(20)
Equity attributable to owners of the Company	**本公司擁有人應佔權益**	76,612,480	71,018,751
Minority interests	**少數股東權益**	47,496	32,215
		76,659,976	71,050,966

A Year in Capsule
大事紀要

08.04.2009
A delegation from the Legislative Council visited ASTRI. The councillors included Mr. Vincent Fang (fourth from right), Mr. Wong Ting-kwong (third from left) and Mr. Paul Tse (third from right).
立法會議員方剛先生(右四)、黃定光先生(左三)及謝偉俊先生(右三)到訪應科院。

01.04.2009
ASTRI established the Bio-Medical Electronics (BME) Team to cope with the growing needs for advanced health care electronics products.
應科院成立生物醫學電子組，研發先進醫療保健電子產品以應市場所需。

23.04.2009
ASTRI and My-IT School jointly held a press conference to launch the first e-Book device myID for e-learning. This e-Book is powered by ASTRI's Mobile Internet Device and mobile peer-to-peer technology platforms. Pilot trials are being conducted in about 40 schools.
應科院及My-IT School聯合舉辦新聞發佈會推出全港首部教學用的電子書myID。此電子書採用應科院開發的移動互聯網設備及流動點對點技術平台，約四十所學校正試用此產品。

22.07.2009
Mr. Wan Qingliang (second from right), Vice-Governor of Guangdong, together with delegates from nine cities in the Pearl River Delta Region visited ASTRI.
廣東省副省長萬慶良先生(右二)及珠三角九個城市的代表到訪應科院。

07.05.2009
ASTRI and Credo Semiconductor Inc., an IC start-up company from Silicon Valley in the United States, signed an agreement to forge ahead the development of high speed data communication IC products for the global market.
應科院與來自美國矽谷的創新企業科睿通半導體有限公司簽署協議，合力研發高速數據傳訊集成電路產品，以配合環球市場需要。

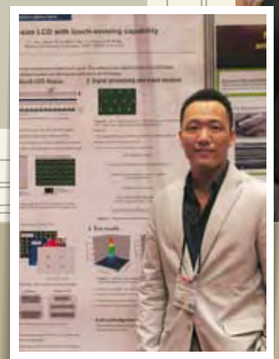
20.08.2009
ASTRI showed its support for youth creativity by being the golden sponsor of the 42nd Joint School Science Exhibition (JSSE). "ASTRI Innovation Award" was presented to Pooi To Middle School for coming up with the best project.
應科院為培育年青人的創意思維，特贊助第四十二屆聯校科展，並設立「應科院創新大獎」。本年度得獎院校為香港培道中學。

22.09.2009
Eight Limited launched the world's first multi-function, high definition (HD) Personal Video Recorder, which was made exceptional by implementing ASTRI's cutting-edge Picture-In-Picture (PIP) technology. The product was later selected the Best Set-top Box by AV Magazine and Best of HDTV Recorder by HDAV Magazine.
Eight Limited 採用了應科院開發的技術，推出了全球首部擁有全高清畫中畫(PIP)功能的高清錄影機。此產品其後獲AV雜誌機頂盒年獎，又獲HDAV雜誌頒贈最佳高清電視錄影機獎。

09 & 23.09.2009
The 2009 Industry and University Consultation Forum was successfully held in Hong Kong and Shenzhen respectively, attracting a total of more than 700 participants from industry and academia.
七百多名業界及學術界人士參加由應科院在香港及深圳舉辦的「二零零九年科技項目推介會」。

05-09.10.2009
ZTE Corporation and ASTRI jointly demonstrated TD-LTE (Long Term Evolution Time Division Duplex) wireless HD video IOT (Interoperability Test) calls during the ITU Telecom World 2009 held in Geneva, Switzerland. This was also the first successful cross-vendor TD-LTE IOT in the industry.
中興通訊與應科院於瑞士日內瓦舉行的世界電信展聯合進行TD-LTE(Long Term Evolution Time Division Duplex)無線高清視頻技術演示。這是業內首個成功的跨廠商TD-LTE互操作性測試項目。

17.11.2009
Under Secretary for Commerce & Economic Development Mr. Gregory So (second from left) and Commissioner for Innovation and Technology Miss Janet Wong Wing-chen (third from left) visited ASTRI.
商務及經濟發展局副局長蘇錦樑先生(左二)及創新科技署署長王榮珍女士(左三)到訪應科院。



12-16.10.2009
MPT Group won the Merck Award for Outstanding Scientific Contribution to the Display Technology with the paper entitled "Large-size LCD with Multi-touch Sensing Capability" at the 9th International Meeting on Information Display (IMID 2009) held in Seoul, South Korea.
材料與構裝技術群組於南韓首爾舉行的第九屆國際信息顯示會議中，發表以「具多點觸控功能的大型LCD」為題的論文，奪得「傑出科學貢獻默克獎」。

01.12.2009
CEO Dr. Cheung Nim-kwan received the Donald W. McLellan Meritorious Service Award from the IEEE Communications Society. As an IEEE Fellow, he was elected to the Board of Directors for a two-year term from 1 January, 2010. Dr. Cheung is the only person from Hong Kong to sit on the current IEEE Board.
行政總裁張念坤博士獲國際電機電子工程師學會(IEEE)屬下通訊學會頒授「通訊學會唐納德馬克蘭傑出服務獎」。張博士是國際電機電子工程師學會院士，他於二零一零年一月一日獲委任為該會理事局成員，任期兩年，是該學會唯一一位來自香港的理事。

11.01.2010
Hong Kong Jockey Club Institute of Chinese Medicine announced the appointment of Prof. Sarah Hui Siu-chun as Executive Director.
香港賽馬會中藥研究院宣佈委任許少珍教授為新一任總裁。

03.12.2009
The Vice-Minister of the Ministry of Industry and Information Technology Mr. Miao Wei (first from left) and Director of the International Cooperation Department Mr. Chen Yin (second from left) visited ASTRI. They showed great interest in the demonstration of new technologies.
國家工業和信息化部苗圩副部長(左一)及國際合作司陳因司長(左二)參觀應科院，他們對新技術的演示深感興趣。

18.01.2010
ASTRI's advanced development in TD-LTE won a Technological Achievement Award in 2009 Hong Kong Awards for Industries. The TD-LTE partner, Innofidei, was chosen by China Mobile as one of the vendors for its Shanghai World Expo TD-LTE data card terminal joint R&D project.
由應科院開發的先進TD-LTE技術在二零零九年香港工商業獎中脫穎而出，取得科技成就獎的榮耀。其合作夥伴創毅視訊更獲中國移動選為上海世界博覽會TD-LTE數據卡終端聯合研發項目的供應商之一。

21.01.2010
Legislative Councillor Mrs. Regina Ip (first from right) led a delegation from the Savantas Policy Institute to visit ASTRI.
立法會議員葉劉淑儀女士(右一)與匯賢智庫成員到訪應科院。

12.03.2010
To celebrate ASTRI's 10th Anniversary, the 2010 seminar series was kicked off. The first key speaker was Prof. C.C. Chan, Honorary Professor of the University of Hong Kong, who delivered a presentation on "Technical & Commercial Roadmaps of Electric & Hybrid Vehicles".
為慶祝成立十周年，應科院於二零一零年舉辦一系列研討會。首位主講嘉賓為香港大學名譽教授陳清泉教授，講題是「電動及混合動力汽車的技術和商業發展藍圖」。

19.01.2010
ASTRI's LED street lamp won the Silver Award, Best Lifestyle in the Hong Kong ICT Awards 2009.
應科院以LED路燈榮獲二零零九年香港資訊及通訊科技獎的最佳生活時尚獎銀獎。

01.03.2010
Mr. Cao Jian-lin (fourth from right), Vice-Minister of the Ministry of Science and Technology, visited ASTRI.
國家科技部曹健林副部長(右四)造訪應科院。

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