Blooming Technologies Promising Future

尖端科技 璀璨未來

Annual Report 2012/2013 年報

ASTRI

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

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尖端科技 璀璨未來

Innovative technologies are crucial factors for achieving economic prosperity and better lifestyle. As a pioneer in applied science and technology research, ASTRI creates world-class technologies by connecting people, industries and markets, working hand in hand with partners to build a promising future.
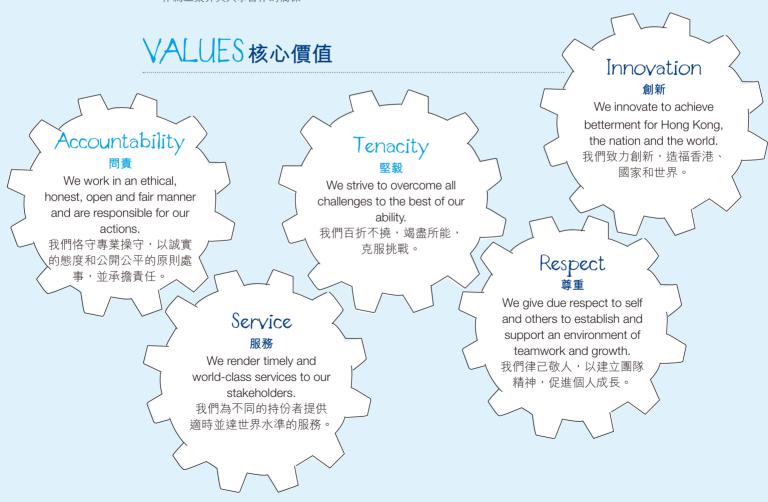
創新科技是實現經濟繁榮和美好生活的關鍵因素。作為應用科技研究的先驅，應科院連接人才、產業和市場，創造世界一流科技，攜手建設璀璨未來。

MISSION 使命

The ASTRI mission is to enhance Hong Kong's competitiveness in technology-based industries through applied research.

應科院肩負的使命，是要透過應用科技的研究，協助發展以科技為基礎的產業，藉此提升香港的競爭力。

GOALS 目標

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

VALUES 核心價值

Innovation
創新
We innovate to achieve betterment for Hong Kong, the nation and the world.
我們致力創新，造福香港、國家和世界。

Accountability
問責
We work in an ethical, honest, open and fair manner and are responsible for our actions.
我們恪守專業操守，以誠實的態度和公開公平的原則處事，並承擔責任。

Tenacity
堅毅
We strive to overcome all challenges to the best of our ability.
我們百折不撓，竭盡所能，克服挑戰。

Respect
尊重
We give due respect to self and others to establish and support an environment of teamwork and growth.
我們律己敬人，以建立團隊精神，促進個人成長。

Service
服務
We render timely and world-class services to our stakeholders.
我們為不同的持份者提供適時並達世界水準的服務。

CHAIRMAN'S FOREWORD
主席序言

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

I am extremely pleased to present this Annual Report which highlights ASTRI's progress and achievement during the period 1 April, 2012 to 31 March, 2013.

First and foremost, I would like to extend my heartfelt appreciation towards the steadfast support and guidance from the Government, industry and the community at large. They all played a key part in steering our Institute to meet its mission and goals. I also wish to put on record my personal appreciation regarding the total commitment and dedication of all members at ASTRI during the past months.

During the year under review, ASTRI harvested the fruits of its hard work in fortifying its presence on the Mainland. I am proud to report the Ministry of Science and Technology in June gave formal approval to ASTRI to establish the Hong Kong Branch of the National Engineering Research Centre for Application Specific Integrated Circuit System in collaboration with Nanjing's Southeast University. Setting up this first ever branch of the national engineering centre in Hong Kong not only marks another major milestone in ASTRI's development, but also demonstrates our R&D strength is well recognized by the Central Government as well as the Mainland academia.

With pride and delight, I also wish to report the Board of ASTRI was awarded the "Directors of The Year Awards" by the Hong Kong Institute of Directors in 2012. This award is no doubt enviable recognition by the local business community towards our Board's achievement in upholding a high level of corporate governance. I am, therefore, certain my fellow Directors, whether new, serving or retired, would share with me the honour of this esteemed recognition.

本人非常榮幸呈上這份年報，當中詳載了自二零一二年四月一日至二零一三年三月三十一日應科院的工作進展與成績。

首先，讓我衷心感謝特區政府、產業各界和社會大眾一直對應科院堅定不移的支持和指導，他們鞭策本院履行使命，達成目標。我也希望藉此對應科院全人在過去一年來全力以赴，克盡職守，予以表揚。

應科院開拓中國內地服務，努力不懈，去年終於取得成果，科技部在六月正式批准應科院與南京東南大學合作在院內成立「國家專用集成電路系統工程技術研究中心香港分中心」。這是香港首個國家工程中心分中心，它的成立不僅是應科院發展的另一個里程碑，也顯示出我們的研發實力和成就深受中央政府和內地學術界重視及認同。

我自豪而欣慰地向大家報告，應科院董事局獲得香港董事學會頒發「2012傑出董事獎」榮譽。這個令人欣羨的獎項無疑是本地商界對本院董事局貫徹優良企業管治的認許。我深信無論新任、現任或是卸任的應科院董事也必如我一樣，對於董事局獲此殊榮，深感榮幸。

ASTRI Board Chairman
Dr. Patrick Wang Shui-chung
(front row, fourth from right) and
Board members at the "Directors
of The Year Awards" presentation
ceremony
應科院董事局主席汪穗中博士（前
排右四）與董事局成員於「傑出董
事獎」頒獎禮上合攝

I must, however, stress that as a publicly-funded research institute, ASTRI, in upholding the highest level of corporate governance, has been responding flexibly to the changing terms and conditions of the business environment, with key focus on the needs of the industrial sector.

Indeed, several measures were adopted by the Board over the past years to further upgrade ASTRI's management quality in planning and control. The company-wide Risk Profiling and Assessment exercise completed in 2010 subsequently led to the establishment of the Risk Register. I am happy to note the register was updated during the year under review. In 2011, Balanced Scorecard was introduced to provide a framework for different functional units to operate towards clear and comprehensible targets. Furthermore, we are currently in the final stage of attaining re-certification of ISO 9001 for both our administration and R&D operation.

Under these steering and control measures, ASTRI's effort in pursuing its mission and goals in enhancing Hong Kong's technological competitiveness has gathered steam. I am pleased to highlight two successful cases during the year in which not only our intellectual properties were licensed, but also young talent of the related R&D teams were transferred to our industry partners. The first case involved Innofidei (Hong Kong) Technology Limited, which subsequent to licensing our LTE technologies, recruited no fewer than 26 of our researchers to join its own R&D centre at Hong Kong Science Park. In another case, Sana Semiconductors Limited, a start-up founded by an entrepreneur from Silicon Valley, while trying to establish its leadership position in the global RF amplifier market for smart phones also took over the ASTRI team after completing a collaborative project.

In both cases, entrepreneurship and related experience were introduced into Hong Kong; employment opportunities for R&D talent were created in the private sector; investments were prompted; and markets beyond the territory were captured. The two cases illustrate vividly how ASTRI is able to fulfil its mission. In fact, at the time of reporting, a number of similar possibilities are

我必須同時強調，應科院作為一所由公帑資助的研究院，在堅守最高水平的企業管治之餘，也一直密切關注工業界的需要，以靈活的措施應對商業環境的變化。

事實上，董事局在過去數年採取了多項措施，進一步提升了應科院在企劃和控制方面的管理質素。我們於二零一零年完成了全公司風險評估，並編訂了風險登記冊，及於本年度更新。在二零一一年本院引入的平衡計分卡，為不同職能部門提供了指標，讓它們朝著清晰明確的目標運作。此外，我們就應科院行政和研發活動重新申請ISO 9001認證的工作，現已進入最後階段。

在這些調控措施下，應科院傾盡全力，務求達成使命，促進香港的科技競爭力。我在此謹分享本年度兩個成功個案，當中應科院不但把知識產權授予業界合作夥伴，更輸出了相關研發組別的年輕人才。第一個個案中，創毅微電子（香港）科技有限公司在取得我們的LTE技術特許授權之餘，也同時禮聘了二十六位應科院研究人員加入其在香港科學園設立的研發中心。在另一個個案，一位來自矽谷的企業家在港創辦了Sana半導體有限公司，力圖在智能電話射頻放大器環球市場建立領導地位；Sana與應科院完成了一個合作項目後，亦聘用了整個研發團隊。

這兩個個案實現了企業家精神，為香港引進了相關經驗，在私營部門為研發人才創造了就業機會，帶動了投資，並開拓了海外市場；兩者也展示出應科院如何達成使命。事實上，目前我們正在嚴謹地考量多個類似的機會，希望在當中每個個案中分拆優秀的技術和其研發者，從而為應科院和合作夥伴開拓出雙贏局面。

being seriously studied. In each of these cases, we hope to spin off both our winning technologies and their inventors and developers, hence cultivating a win-win situation for both ASTRI and its partners.

I am proud to point out that after more than a decade of development, ASTRI, besides amassing an impressive volume of technological output, has also nurtured numerous creative R&D talents. As the spin-off strategy is gaining momentum, I earnestly hope ASTRI could become a cradle of "serial entrepreneurs" who, apart from achieving personal success, could help Hong Kong excel in its journey of transforming from a labour intensive to a knowledge and technology-based economy.

As far as ASTRI's future R&D direction is concerned, my personal view is that considerable efforts must be directed at disruptive innovations. ASTRI's disruptive technologies, either at low-end or premium levels, should not only be of an applied nature, but must also be able to either present new experience to users or improve the technical aspects of the products concerned. Overall, our disruptive innovations must aim at bringing substantial improvement to the quality of life for people all over the world.

During the year, the composition of the Board of Directors changed considerably. With deep appreciation and gratitude we bid farewell to eight retired members who made invaluable contributions during their term of office. They are former Permanent Secretary for Commerce and Economic Development (Communications and Technology) Miss Elizabeth Tse Man-yee, Dr. Sunny Chai Ngai-chiu, Prof. Chew Weng-cho, Dr. Patrick Lam See-pong, Mr. Henry Leung Kwong-han, Dr. Humphrey Leung Kwong-wai, Mr. Richard Sun Po-yuen and Mr. Peter Wong King-fai. I have no doubt that we at ASTRI could continue to count on their support and advice in future.

At the same time, I wish to extend warm welcome to Miss Susie Ho Shuk-yee, Permanent Secretary for Commerce and Economic Development (Communications and Technology), who joined the Board as Official Director. I also welcome seven other newly-appointed Directors – Mr. Christopher Britton, Partner, Deacons; Prof. Roland Chin Tai-hong, Deputy Vice-Chancellor and Provost, The University of Hong Kong; Mr. Humphrey Choi Chor-ching, Partner, PricewaterhouseCoopers; Dr. Tiger Lin Zhenhui, Chairman, China Mobile Hong Kong Company Limited; Mr. Sunny Lee Wai-kwong, former Executive Director, Information Technology, Hong Kong Jockey Club and Vice-President (Administration), City University of Hong Kong; Mr. Denis Tse Tik-yang, Head of Private Investments – Asia, Lockheed Martin Investment Management Company; and Mr. Wong Ming-yam, Director, Top Brilliant Technology Limited. My fellow Board Directors and I look forward to working closely with them in the months ahead. Together, we will further strengthen our efforts in building ASTRI into an innovative, productive, responsible and above all, accountable R&D centre that the people of Hong Kong would be proud of.

應科院經過十多年的發展,除了累積了大量技術成果及技術專利,也培育了很多富創意的研發人才,令我深以為傲。現時分拆業務已漸成推動應科院發展的策略,我衷心希望應科院能夠成為「連環企業家」的搖籃,讓這批由應科院培育的年輕企業家除取得個人成就外,也可協助香港從勞工密集型經濟成功過渡至知識及技術型經濟。

就應科院未來的研發方向而言,我認為必須著力於突破性的創新,應科院不論在低端或高檔次的突破性科技不應純屬應用性質,也須能帶給用家新的體驗,或在相關產品的技術方面有所改進。總括而言,我們的突破性創新科技必須以給全世界人類生活質素帶來實質改善為目標。

年度內,董事局成員有不少的更替。我們懷著深切的謝忱,與八位卸任董事惜別。他們是前任商務及經濟發展局常任秘書長(通訊及科技)謝曼怡女士、查毅超博士、周永祖教授、林師龐博士、梁廣恆先生、梁廣偉博士、孫寶源先生及黃景輝先生。他們在任內貢獻良多,我也深信今後他們仍會繼續支持和指導應科院的發展。

與此同時,我也熱烈歡迎商務及經濟發展局常任秘書長(通訊及科技)何淑兒女士加入董事局成為官守董事,以及另外七位新獲委任的董事 — 的近律師行合夥人貝敦先生、香港大學首席副校長錢大康教授、羅兵咸永道會計師事務所合夥人蔡楚清先生、中國移動香港有限公司董事長林振輝博士、前香港賽馬會資訊科技事務執行總監及現任城市大學副校長(行政)李惠光先生、洛克希德馬汀投資管理有限公司亞洲私募投資總監謝迪洋先生,及新璟陽企業發展集團有限公司董事王明鑫先生。我與一眾現任董事期待於未來的日子與他們緊密合作,同心協力把應科院建設成一所創新、高效、負責、勇於承擔,及令香港人引以為榮的研發中心。

Patrick Wang Shui-chung
Chairman of the Board
董事局主席 汪穗中

CHIEF EXECUTIVE OFFICER'S REVIEW
行政總裁回顧

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

The year under review has undoubtedly been another successful hallmark for ASTRI. Besides meeting and even exceeding all key targets set by the Board, we achieved excellence in attracting industry's support to our endeavours.

I am excited in reporting that ASTRI in June 2012 reached an important milestone when it received formal approval from the Ministry of Science and Technology to establish the Hong Kong Branch of the National Engineering Research Centre for Application Specific Integrated Circuit System in collaboration with Nanjing's Southeast University (SEU).

The establishment of this centre, which is the first branch of the national research centre outside the Mainland, clearly reflects the Central Government's confidence in ASTRI's R&D capabilities. The whole ASTRI community is excited about this development and feels extremely honoured by the recognition it represents. We strongly believe that by leveraging the combined strengths of ASTRI and SEU, the Hong Kong Branch will be able to deliver world-class integrated circuits (IC) and application systems for enhancing the competitiveness of the IC industry in both Hong Kong and the Mainland.

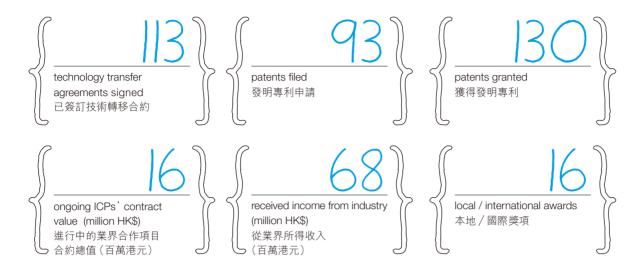回顧過去一年，應科院再次取得驕人成績。除達到甚至超越董事局設定的所有重要目標外，在爭取業界對本院工作的支持方面，也表現卓越。

本人懷著興奮的心情，欣然向大家報告，應科院於二零一二年六月獲國家科學技術部批准，與南京東南大學合作成立「國家專用集成電路系統工程技術研究中心香港分中心」，為本院發展開創了一個重要的新里程。

今次是國家研究中心首次在中國內地以外的地方成立分中心，充分反映中央政府對本院科研能力的高度肯定。本院全仁對於應科院獲委以重任，都感到十分興奮和無比光榮。我們堅信，結合應科院和東南大學的優勢，分中心將可以開發世界一流的集成電路和應用系統，提升內地和香港產業的競爭能力。

The plaque unveiling ceremony of the Hong Kong Branch of the National Engineering Research Centre for Application Specific Integrated Circuit System
國家專用集成電路系統工程技術研究中心香港分中心揭牌典禮

113
technology transfer
agreements signed
已簽訂技術轉移合約

93
patents filed
發明專利申請

130
patents granted
獲得發明專利

16
ongoing ICPs' contract
value (million HK$)
進行中的業界合作項目
合約總值（百萬港元）

68
received income from industry
(million HK$)
從業界所得收入
（百萬港元）

16
local / international awards
本地／國際獎項

While details of ASTRI's development and achievements over the past year are elaborated in other chapters of this report, I wish to highlight the following key accomplishments:

The total amount of income ASTRI received from industry exceeded HK$68 million, representing a 12 per cent increase over the past year.

A total of 113 technology transfer agreements were signed, which is an increase of 36 per cent compared with the previous year.

Contract Research, in which our partners are responsible for 100 per cent project cost in exchange for ASTRI's customized R&D services, took up more than 65 per cent of the agreements signed. The surging popularity of Contract Research as a form of collaboration has once again reflected the industry's growing confidence and expectations in ASTRI's R&D undertakings.

Industry Collaborative Project (ICP), which requires substantial injection of funding and other resources from our partners, also progressed steadily. There were six ongoing ICP projects during the year with a combined contract value close to HK$16 million.

ASTRI's patent portfolio also increased significantly with 130 new patents granted, while 93 patent applications were filed for this period. The total number of patents granted to ASTRI stood at 366 at the end of the year. This accumulated wealth of intellectual properties is solid testimony of our innovative R&D efforts.

應科院本年度的重要發展和成就詳載於本報告其他章節，以下為大家簡報一些重點：

應科院從業界所得總收入超過六千八百萬港元，比去年增加百分之十二。

本院與業界簽定技術轉移合約共一百一十三份，與去年相比，增幅達百分之三十六。

由合作夥伴負責全部研發成本，及由應科院提供定制服務的「合約研究項目」，佔所簽訂合約數目百分之六十五以上。「合約研究項目」的增加，充份顯示業界對本院科研實力的信心和期望正與日俱增。

需要合作夥伴注入資金和其他研發資源的「業界合作項目」也穩步發展。年內，應科院在進行六個「業界合作項目」，合約總額接近一千六百萬港元。

應科院在取得技術專利方面也有顯著增長，除獲得一百三十項新專利，本院在去年也為各種新技術提交了專利申請共九十三項。以本年年底結算，應科院擁有的專利合共三百六十六項。擁有如此豐富的知識產權，是本院為創新研發所付出的努力的一個明證。

Dr. Cheung (second from left)
and Dr. Tom Zhang (second from
right), Founder and Chairman of
Innofidei Corporation, exchange
a warm handshake after signing
the agreement. ASTRI Chairman
Dr. Patrick Wang (first from left)
and Deputy Commissioner for
Innovation and Technology
Mr. Johann Wong witness
the signing
張念坤博士（左二）與創毅創辦人
兼董事長張輝博士（右二）於簽約
儀式上互相祝賀。應科院董事局
主席汪穗中博士（左一）及香港創
新科技署副署長黃宗殷先生見證
簽約儀式

In addition to the above, it is particularly worth reporting ASTRI also achieved considerable success in its commercialization efforts. One distinct case involved the exclusive licensing of the embedded DSP and L1 control software of UE baseband technology to our long-term partner, Innofidei (Hong Kong) Technology Limited. ASTRI's contributions to industry were not limited to technology transfers but also R&D talent vital to our partners' continuous development. Following the signing of the licensing agreement, 26 of our budding researchers joined the new research centre set up by Innofidei in Hong Kong Science Park to further continue their R&D work on LTE.

There were also other successful cases in which our home-grown technologies were adopted by marketers around the globe. To name a few examples, our 2D to 3D real-time video conversion technology was incorporated into a 3D converter for U.S. and European markets; an auto-focus and optical image stabilization compact camera module was adopted by a world famous brand for its new smart phone launched in the global market; and our smart consumer electronics operating system was integrated into a family cloud solution product by a U.S.-based company.

On home soil, the award-winning ALS System for e-Learning co-developed by ASTRI and partner was incorporated in the e-Learning Solution launched by HKT education. Another project, the e-classroom, also won a couple of licensing contracts both at home and abroad. ASTRI's e-Learning as well as e-classroom solutions have been deployed in many local schools to support the Education Bureau plan in promoting e-Learning in Hong Kong.

此外，本院為推廣技術商品化所付出的努力也得到相當滿意的成果。年內，應科院將終端基帶技術的嵌入式DSP和L1 控制軟件以獨家形式授權予長期合作夥伴創毅微電子（香港）科技有限公司。應科院為業界所貢獻的不僅限於技術，也包括科技人才的轉移，這對於合作夥伴的持續發展非常重要。在雙方簽訂合約後，二十六名本院研究員便加盟了創毅在香港科學園開設的研發中心，繼續他們在LTE技術上的研究工作。

應科院亦成功將本地開創科技推介到世界各地，以下列舉幾個例子：應科院的二維至三維實時視象轉換平台，獲客戶納入他們的三維轉換器中，該產品已在歐美市場發售；光學防抖和自動對焦微型相機模組獲一個世界知名品牌採用在其新款手機上作全球發行；為消費電子產品而設計的智能操作系統則獲一間美國公司整合來設計一個家庭雲解決方案。

本港方面，由應科院與合作夥伴合作研發並獲獎的電子學習ALS系統獲HKT education採用並推出「電子學習方案」。另一個名為「電子教室」的項目，也獲本地和海外客戶垂青，成功簽訂了技術授權合約。應科院在電子學習和電子教室兩方面的方案，目前已在本港多間學校試用，以配合教育局在香港推行電子學習的計劃。

In continuous and wide-ranging collaboration with government agencies and public organizations in applying and testing our new technologies in real-life situations, ASTRI worked with the Transport Department in conducting a trial to substitute traditional incandescent lamps with our BB lamps at zebra crossings. Results showed the BB lamps are much more power-saving and reliable even under adverse weather conditions. The successful trial provides strong basis for the Government to implement the plan of replacing incandescent lamps with LED lamps in the future. With support from the Government and other organizations, ASTRI looks forward to turning more innovative technologies into practical use for the community.

It has been truly recognized that the driving force behind all the accomplishments is our people. R&D talent will always be our cornerstone and determining factor for a successful future. Hence, ASTRI has never lost sight on nurturing the next generation of technological human resources. I am glad to see that ASTRI, through employment and its internship programmes, has continued to serve as an avenue providing proper training for university graduates aspiring to become scientists or engineers. Since its founding, ASTRI has employed and nurtured no fewer than 1,000 R&D talent, as well as more than 170 interns from local and overseas universities.

應科院去年與政府機構和公共機構緊密合作，將多種新科技佈置在現實環境中進行測試。其中運輸署在馬路上安裝本院研發的斑馬線燈，試行替代傳統的白熾熱燈。結果顯示這些斑馬線燈不但更省電，而且即使在惡劣天氣下仍能穩定操作。是次測試的結果，將為政府未來推行以LED燈全面取代白熾熱燈提供了有力的根據。應科院期望在政府和其他機構的支持下，把更多創新科技轉化為有實際用途的技術，令市民受惠。

毫無疑問，應科院成功背後的主要推動力是我們的人才。研發專才是我們未來發展的重要基石和成功的決定性因素，因此應科院一直十分注重培訓新一代的科技人才。對於大學畢業生來說，應科院一直被視為培育未來科學家和工程師的搖籃。應科院自成立以來，已培育了不少於一千名全職研發人員；透過實習研究員計劃培訓的本地和海外大學生也超過一百七十名。

Dr. Cheung (right) addresses the China (Shenzhen) IT Summit 2013
張博士（右）於2013（深圳）
IT領袖峰會上發言

Dr. Cheung (left) happily mingles with staff and visitors at the ASTRI booth during Innocarnival
張博士(左)於應科院參展「創新科技嘉年華」期間，與職員和參觀者暢談甚歡

To ensure further progress, the Innovation and Technology Commission formed a Review Committee to conduct a thorough examination of ASTRI's operations. Four working groups were formed under the Committee focusing on topics including:

為確保應科院的發展能更上一層樓，創新科技署去年成立了一個檢討委員會，全面檢討應科院的工作。委員會轄下有四個工作小組，每個小組負責一個檢討範疇，包括：

1

Review of past performance of ASTRI
檢討應科院過往業績

2

Industry contribution
從業界所得收入

3

Customers' expectations of ASTRI/commercialization
客戶對應科院／商品化的期望

4

Cultural and performance appraisal system
文化及績效考核體系

Moreover, in a bid to put more emphasis on possible spin-offs, the Board took the initiative of setting up a special committee to steer spin-off strategies and execution aimed at encouraging more entrepreneurs to venture into new businesses with ASTRI's technologies and support.

At the time of reporting, the two Committees were vigorously reviewing their findings and formulating recommendations. I am certain that through the work of the Committees, we will be able to identify challenges and opportunities ASTRI faces and devise appropriate strategies to chart our course forward.

Since my appointment in December 2008, ASTRI has achieved many important milestones and technological breakthroughs. While I am sure all members of the ASTRI community share the pride and excitement of our accomplishments, I owe much gratitude to all of them for their commitment and contributions in making what ASTRI is today.

Indeed, it is my honour and privilege to work with a group of talented and dedicated professionals. With visionary guidance and steadfast support from the Government, industry, my colleagues and above all, the community at large, I have every confidence ASTRI will stand the test of time and continue playing a vital role in building the innovation and technology sector as an important pillar for future development of Hong Kong.

此外，應科院董事局亦決定推動業務分拆，並為此成立了一個特別委員會，專責制定業務分拆的策略和執行細節，目的是鼓勵更多企業家和應科院合作，利用本院的科技來開發新業務。

本人在撰寫此報告的時候，兩大委員會正積極檢視檢討結果並提出建議。本人深信透過委員會的工作，應科院可以更有把握地迎接面對的機遇和挑戰，並制定合適的策略來開拓未來。

自二零零八年十二月本人獲委任至今，應科院已建立多個重要里程碑，並取得多項技術突破，相信本院的全體成員都同樣感到興奮和自豪。對於應科院所有成員為本院的成就所付出的努力和貢獻，本人謹致以衷心的感謝。

事實上，能夠與一班充滿創意和幹勁的科技人才一起共事，令本人深感榮幸。藉著政府、業界、同僚和廣大市民繼續給予的引導和支持，本人深信應科院必定能夠與時並進，繼續為建設香港成為一個以創新和科技作發展支柱的城市擔當重要的角色。

Cheung Nim-kwan
Chief Executive Officer
行政總裁 張念坤

STRENGTHENING TIES
FLOURISHING INDUSTRY

合作無間 成就輝煌

PERFORMANCE
業績

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

A very critical part of ASTRI's customer-focused R&D practices is the rigorous setting and monitoring of quantitative performance targets. The targets are used as essential basis for appraising performances of R&D groups/teams and their leaders. The three main types of quantitative performance targets are:

作為一家由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。為了創造更大的經濟效益,應科院過去一直全力以赴,以顧客需求和技術轉移作為工作重點。

應科院為其業績設立嚴謹的可量化目標,成為其以顧客為導向的研發工作中重要的一環。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:

Quantitative Performance Targets 可量化工作目標

Number of technologies transferred to industry per year 每年轉移至業界的技術數目

This is most crucial as they are the "path" towards commercializing IPs developed by R&D projects
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

Number of patent applications filed/granted and their success ratio 每年申請和取得的專利數目及其成功率

This is important because patents are essential indicators of the worthiness of innovations and are used to increase the value of technology transfers
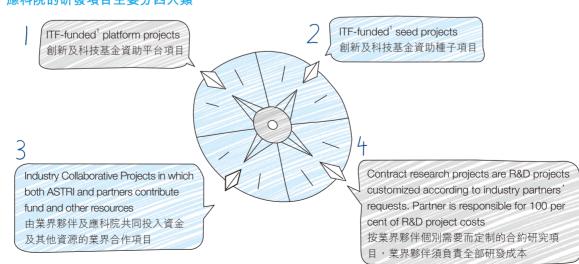專利是評估所研發的技術是否有價值的主要指針,並可增加技術轉移活動的價值,因此十分重要

Annual income from industry 每年從業界所得的收入

As ASTRI continues to engage customers and build a valuable brand name for its customer base, the eventual income from this base through services such as licensing and technology sales, design and product development will increase
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

During the year, ASTRI achieved satisfactory results and steady progress in all the above target areas.

年度內,應科院在各個工作目標均取得平穩進展和令人滿意的成績。

The four main types of research projects undertaken by ASTRI
應科院的研發項目主要分四大類

1 ITF-funded[1] platform projects
創新及科技基金資助平台項目

2 ITF-funded[1] seed projects
創新及科技基金資助種子項目

3 Industry Collaborative Projects in which both ASTRI and partners contribute fund and other resources
由業界夥伴及應科院共同投入資金及其他資源的業界合作項目

4 Contract research projects are R&D projects customized according to industry partners' requests. Partner is responsible for 100 per cent of R&D project costs
按業界夥伴個別需要而定制的合約研究項目,業界夥伴須負責全部研發成本

[1] Innovation and Technology Fund
創新及科技基金

Technology Transfers 技術轉移

The *number of technology transfers to industry* was 113 in 2012/13. The breakdown by R&D groups for the past three years is:

二零一二／一三年應科院向業界轉移的技術數量共一百一十三項。各研發群組過去三年*向業界轉移的技術數量*表列如下：

R&D Group	研發群組	2012/13	2011/12	2010/11
● Communications Technologies	通訊技術	19	18	18
● Enterprise & Consumer Electronics	企業與消費電子	23	17	18
● IC Design	集成電路設計	24	18	11
● Material & Packaging Technologies	材料與構裝技術	45	26	28
● Bio-Medical Electronics (Team)	生物醫學電子（組）	1#	1	0
● Exploratory Research Laboratory (Team)	信息研究室（組）	1	3	N.A. / 不適用
Total	**總數**	**113**	**83**	**75**

\# Joint project with Material & Packaging Technologies Group
與材料與構裝技術群組合作項目

The following table illustrates the *number of technology transfers to industry by various channels* during the past three years:
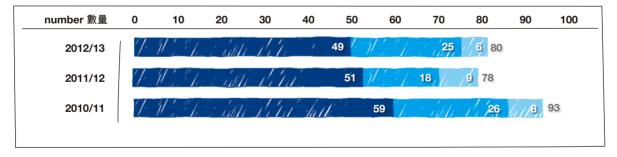
下表列出過去三年應科院通過*各種途徑向業界轉移技術的數目*：

		2012/13	2011/12	2010/11
Industry Collaborative Project agreements signed	已簽訂的業界合作項目合約	1	4	2
Contract research project agreements signed	已簽訂的合約研究項目	75	51	41
Licensing agreements signed	已簽訂的授權合約	37^	28	32
Total	**總數**	**113**	**83**	**75**

^ Some licensing agreements include contract research services
部分授權合約包含合約研究服務

The following table shows the number of the *three major types of projects undertaken by ASTRI* in the past three years.

下表展示過去三年應科院*進行的三類主要研發項目*的數量：

■ ITF-funded Platform Projects
創新及科技基金資助平台項目

■ ITF-funded Seed Projects
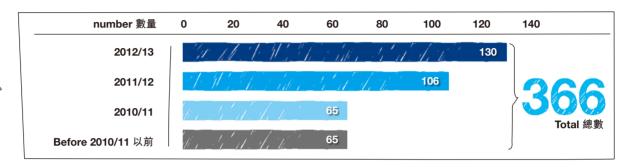創新及科技基金資助種子項目

■ Industry Collaborative Projects
業界合作項目

Patents

As at 31 March, 2013, ASTRI was granted 366 patents for its technologies. The **number of patents granted** has continued to grow per year:

專利

截至二零一三年三月三十一日止，應科院所研發的技術共取得三百六十六項專利。下表展示應科院過去**獲得的專利數目**每年遞增：

130
Patents granted
獲得發明專利

366
Total 總數

number 數量	0	20	40	60	80	100	120	140
2012/13								130
2011/12						106		
2010/11				65				
Before 2010/11 以前				65				

A total of 93 patent applications were filed on the Mainland, U.S. and other countries in 2012/13. The following table shows the **number of applications filed** by R&D groups on the Mainland, U.S. and other countries in the past three years:

在二零一二／一三年，應科院在中國內地、美國及其他國家共提交九十三項專利申請。下表列出過去三年各研發群組**申請的專利數目**：

93
Patents filed
發明專利申請

R&D Group	研發群組	2012/13	2011/12	2010/11
Communications Technologies	通訊技術	17	12	7
Enterprise & Consumer Electronics	企業與消費電子	17	8	16
IC Design	集成電路設計	22	18	10
Material & Packaging Technologies	材料與構裝技術	37	62	52
Bio-Medical Electronics (Team)	生物醫學電子（組）	0	0	2
Exploratory Research Laboratory (Team)	信息研究室（組）	0	0	N.A. / 不適用
Non-R&D department	非研發部門	0	1	1
Total	**總數**	**93**	**101**	**88**

Successful Commercialization
應科院技術成功市場化

ASTRI signed 113 agreements for technology transfers to industry through licensing, contract research and other means, resulting in many commercialization cases. The following are some highlights:
在二零一二／一三年，應科院藉技術授權、合約研究及其他形式與業界簽訂一百一十三項技術轉移合約，成功市場化的個案很多，以下是一些重要例子：

Baseband LTE User Equipment Technology
LTE基帶終端設備技術

Embedded DSP and L1 control software of UE baseband technology was exclusively licensed to ASTRI's long-term partner Innofidei (HK) Technology Ltd for a period of 15 years. With the agreement, Innofidei set up an R&D centre in Hong Kong Science Park and was joined by 26 R&D researchers from ASTRI. Innofidei, which has already launched its LTE terminal products in the market, will continue to seek ASTRI technologies to expand into LTE high-value-added networking markets.
應科院以獨家形式將終端基帶技術的嵌入式DSP和L1控制軟件授權予長期合作夥伴創毅微電子（香港）科技有限公司，為期十五年。創毅隨即在香港科學園設立研發中心，應科院的二十六位研究員亦加盟該中心繼續研究工作。創毅已在市場上推出LTE終端產品，該公司會繼續採用應科院的技術，以擴展在LTE高附加值的網絡市場。
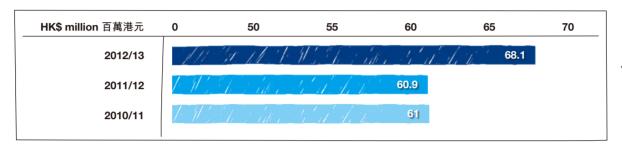
Income from Industry

During the year, income from industry received[1] for all projects amounted to HK$68.1 million, with the contribution level[2] at 25.3 per cent. The table below shows *income received from industry* in the past three years:

業界收入

是年度從所有項目取得的業界收入[1]總額為六千八百一十萬港元，業界投入資金水平[2]為百分之二十五點三。下表顯示過去三年*從業界所得收入*：

[1] Including cash and in-kind contribution
包括現金及物資資助

[2] Percentage of industry income received over total R&D project spending
從業界所得收入佔總研發項目支出的百份比

HK$ million 百萬港元	0	50	55	60	65	70
2012/13						68.1
2011/12				60.9		
2010/11				61		

**Received income from Industry
從業界所得收入
68**
million HK$
百萬港元

The table below *compares income from industry received* by R&D groups in the past three years:

下表把過去三個財政年度各個研發群組所獲得的*業界收入作一比較*：

R&D Group	研發群組	2012/13 HK$M 百萬港元	2011/12 HK$M 百萬港元	2010/11 HK$M 百萬港元
● Communications Technologies	通訊技術	21.6	17.6	20
● Enterprise & Consumer Electronics	企業與消費電子	11.7	12.7	15.9
● IC Design	集成電路設計	14.6	10.3	10.6
● Material & Packaging Technologies	材料與構裝技術	18.9	19.5	14.7
● Bio-Medical Electronics (Team)	生物醫學電子（組）	1.2	0.8	(0.2)
● Exploratory Research Laboratory (Team)	信息研究室（組）	0.1	0	N.A. / 不適用
Total	**總數**	**68.1**	**60.9**	**61**

Mobile e-Learning
移動電子學習

ASTRI collaborated with Active Learning Solutions (ALS) Ltd and successfully developed an ALS System for managing e-learning activities and devices in the classroom. The ALS System, together with cloud-facilitated e-learning technologies developed by ASTRI, was adopted by HKT education Ltd in its e-learning solution launched in the market in 2012. The solution facilitates primary school teachers to manage classes more effectively and enhances teaching efficiency. Furthermore, the ALS System has been deployed in schools in Shanghai since late 2012.

應科院和 Active Learning Solutions (ALS) 公司合作，成功開發出一套在課堂管理電子學習活動和設備的 ALS 系統。該系統連同應科院開發的雲端輔助電子學習技術，獲 HKT education Ltd 的「電子教學方案」採用，並於二零一二年推出市場。「電子教學方案」令小學教師可有效地管理課堂，提高教學成效。ALS 系統從二零一二年年底已開始在上海的學校部署使用。

Use of Technologies in Public Sector

在公共部門應用新科技

ASTRI actively takes part in the "Promotion of Innovation and Technology in Public Sector" programme initiated by the Innovation and Technology Commission. We are working closely with various government agencies, universities and NGOs to introduce ASTRI technologies to the public, allowing people to experience the benefits of using new technologies in real-life context. The following are some of the projects:

應科院積極參與由創新科技署推出的「在公共部門推廣創新科技應用」計劃。我們現正透過與各政府機構、大學及非牟利組織合作將本院科技向市民推介,讓他們在日常生活中體驗新科技帶來的好處。以下為部份合作試驗項目:

Belisha Beacon Lamps

斑馬線燈

The Transport Department conducted a pilot scheme to use ASTRI's Belisha beacon (BB) lamps to replace conventional incandescent lamps at four public spots in the city. After nine months of testing, all 12 BB lamps proved to perform well under all kinds of adverse weather conditions. This joint initiative by the Transport Department and ASTRI was in response to the Government's plan to progressively phase out inefficient incandescent light bulbs. The BB lamps are lit by stable and power-efficient LED drivers designed by ASTRI engineers. They consume much less electricity than incandescent lamps.

運輸署在本港四個公共地方安裝由應科院研發的斑馬線燈(又稱BB燈),測試是否可以用它們取代傳統的白熾燈。經過九個月的測試,結果證實該十二支新款斑馬線燈均表現優異,即使暴露在各種惡劣天氣情況下,仍然正常運作。運輸署及應科院今次合作測試新款斑馬線燈,是以行動積極響應政府逐步淘汰低效白熾燈的倡議。這些斑馬線燈是由應科院研發的LED驅動器驅動,不但操作非常穩定而且比傳統的斑馬線燈要省電得多。

Interactive Display for e-Classroom

電子教室的互動顯示屏

Optical multi-touch technology was applied to develop an e-classroom solution comprising an e-board for teacher and e-desks for students. The solution greatly enhances interaction between teacher and students in class. The Education Bureau is taking the lead in promoting this application. Trials are being conducted in more than 20 local schools.

利用光學多點觸控技術研發的電子教室方案,包括老師用的電子板和學生用的電子桌。此方案大大提升了老師和學生在課堂上的互動。教育局帶頭向本地學校推廣此電子教室方案,現已安裝於超過二十間本地學校以進行試用。

e-Learning

電子學習

ASTRI's e-learning solution was set out to support the Education Bureau's promotion for e-learning. A total solution including a cloud-based learning management system, a classroom activity management system, along with learning applications running on tablets, has been deployed in many schools taking part in the e-Learning Pilot Programme.

應科院以其開發的電子學習解決方案來支持教育局推廣電子學習,該方案包括一個基於雲計算的電子學習管理平台、一個教室活動管理系統,以及一系列在平板電腦上運作的應用程式,已在多間參加「電子學習試驗計劃」的學校內部署試用。

Optical Image Stabilization and Auto-focus Compact Camera Module
具備光學防抖動及自動對焦功能的微型相機模組

ASTRI's compact camera module was adopted by a well-known international mobile phone manufacturer and used in one of its newest handset models released in the market in early 2013, drawing much media attention. ASTRI's compact camera module containing both optical image stabilization and auto-focus functions is known to be the first and most compact of its kind in the industry worldwide. ASTRI exclusively licensed the technologies to AP Photonics Ltd, a Hong Kong-based company tapping the global camera phone market in 2010.

應科院的微型相機模組獲一家全球知名手機品牌採用於一款新型號手機內,該款手機於二零一三年年初發行時引起媒體高度關注。應科院的微型相機模組包含了光學防抖和自動對焦功能,是全球首創而且體積最小。應科院於二零一零年將技術以獨家形式授權予愛佩儀光電技術有限公司,該公司以香港作為基地,進軍環球手機相機市場。

Telehealth

ASTRI is conducting a trial of its telehealth technology platform for serving outpatients in a public hospital. The platform has also been adapted for elderly care centres operated by a non-profit-making organization.

遠程醫療

應科院正在一家公立醫院測試遠程醫療技術平台，為門診病人提供服務。該平台也獲一個由非牟利機構經營的護老中心採用。

Intelligent Mobile Surveillance Technology Platform

The Hong Kong Police Force is conducting field tests on ASTRI's dual-LTE channel mobile device which enables reliable real-time transmission of high quality videos under harsh conditions.

智能移動監控技術平台

香港警務處正進行實地測試應科院設計的雙LTE移動設備。此設備讓警務人員在惡劣環境中仍能以LTE頻道實時傳送高質素視頻。

Immersive Distraction Goggle

Immersive distraction goggle, an audiovisual eyewear designed to allay patient's negative feelings, such as pain and anxiety during medical treatment was installed in the first mobile physiotherapy van in Hong Kong.

沉浸式分散注意力目鏡

沉浸式分散注意力目鏡獲安裝在香港首輛流動物理治療車上。該目鏡透過在治療過程中播放影音內容，分散病人的注意力，以舒緩他們在醫療過程中的焦慮和痛楚等負面情緒。

High-speed Digital Pathology System

A large scale trial of the digital pathology system was carried out in collaboration with the University of Hong Kong. The trial involved the diagnosis of 1,000 digitized pathology slides by 10 pathologists with different levels of experience. The results were used to evaluate the efficiency of using digitized slides for diagnosis.

高速數碼病理系統

應科院與香港大學合作進行了一次大規模的數碼病理系統測試。由十位不同年資的病理醫生對一千張數碼切片進行分析，測試結果是用來評估以數碼切片作診斷的成效。

Group Portal for Scouts

ERL engineers built a group portal for scouts enabling more than 100 scout groups in Hong Kong to create their group websites with ease. The portal also enhances communication among the ten thousand scouts in Hong Kong. ASTRI also provided storage space, backup and maintenance support.

童軍旅團網站

信息研究室的工程師為香港童軍建立了一個旅團網站管理系統，讓逾一百個香港童軍旅團輕鬆建立各自的網站。該系統亦有助促進本港過萬名童軍之間的溝通。應科院並且為童軍旅團用戶提供儲存空間、備份服務及技術支援。

2D to 3D Real-time Video Conversion
二維至三維實時視頻轉換

The technology can instantly convert 2D images from different video sources into very natural 3D images, which can be enjoyed with 3D glasses or even naked-eyes. The technology was licensed to a U.S. company and embedded into its flagship product 3D converter, offering high quality and low-cost 3D images. The product is being sold in U.S. and European markets.

此技術可即時將不同視頻來源的二維影像轉換成三維影像，效果自然逼真，可以用三維眼鏡甚至裸眼欣賞。該技術已授權予一家美國公司，結合他們的旗艦產品三維轉換器來提供高質素、低成本的三維視頻。該轉換器現已在美國及歐洲市場發售。

Outreaching to Industry and Society

ASTRI continued to organize visits, seminars and other activities for people from different sectors to gain an understanding of the Institute and its home-grown technologies. ASTRI also actively supported or participated in activities organized by other companies or organizations to maintain good connection with industry and people.

Apart from these initiatives, ASTRI also entered into agreements with partners in Hong Kong, the Mainland and abroad, to expand the scope of cooperation for promoting different technologies in different markets.

The following table summarizes ASTRI's outreaching activities for the period 1 April, 2012 to 31 March, 2013.

聯繫業界和社會

應科院持續接待訪客，舉辦研討會及其他活動，讓來自不同領域人士認識應科院及本地研發科技。應科院同時積極支持和參予其他公司及機構所舉辦的活動，與業界和大眾保持緊密聯繫。

除了各種活動，應科院又與本港、中國內地和海外的合作夥伴簽訂合作協議，以擴大合作範圍，在不同的市場推廣不同的科技。

下表總結本院於二零一二年四月一日至二零一三年三月三十一日所舉行的活動。

No. of visits organized more than 接待探訪次數超過 **100**	No. of visitors received close to 接待訪客人數接近 **1,200**	No. of ASTRI seminars organized 舉辦研討會 **31**	No. of participants in ASTRI seminars about 參加研討會人數約 **2,700**
No. of other events/activities organized or supported by ASTRI 由應科院舉辦或支持的其他節目／活動 **65**		No. of cooperation memorandums signed with partners 與合作夥伴簽訂的合作意向書 **16**	

P2P Software for Olympics Telecast
P2P 多媒體分發技術支援奧運網上直播

ASTRI's iShare P2P software was adopted by i-Cable during the 2012 London Olympics for smooth telecast on the Internet and mobile networks accessible through PCs, iPhones, iPads and Andriod phones and tablets.
應科院的 iShare P2P 多媒體分發技術獲有線電視採用，通過互聯網和無線網絡，作二零一二年倫敦奧運網上直播。觀眾利用桌面電腦、iPhone、iPad 及 Android 手機和平面電腦，便可流暢地欣賞賽事。

Awards and Accolades

ASTRI received a number of prestigious honours and awards during the year, illustrating our R&D capabilities and staff achievements are well recognized by industry at home and overseas.

ASTRI Board of Directors was selected "Directors of The Year 2012" by The Hong Kong Institute of Directors.

Dr. Wu Enboa, Vice President and Group Director of Material and Packaging Technologies Group, was named one of the "Top Ten Persons of the Year" in the LED Industry Billboard Awards by China Shenzhen LED Industry Association.

Prof. Peter Yum, ASTRI's Chief Technology Officer, was conferred the title of Fellow by the Institute of Electrical and Electronics Engineers (IEEE), for contributions to the architecture and resource management of communication networks.

ALS System – an e-learning management system co-developed by ASTRI and Active Learning Solutions -- won Gold Award, Best Lifestyle (Learning & Living) in the Hong Kong ICT Awards 2013.

ASTRI's partner Voloe Technology won Silver Award, Best Green ICT (Innovation) in the Hong Kong ICT Awards 2013 with its green power smart wireless sensor developed with technologies licensed from ASTRI.*

ASTRI's partner Innofidei (HK) Technology Ltd., supported by an R&D team comprising engineers who formerly worked at ASTRI, was winner of the Innovative Technology Achievement Award by the Hong Kong Federation of Innovative Technologies and Manufacturing Industries (FITMI) for their pioneer work in developing LTE TDD/FDD dual-mode terminal SoC chipset. *

獎項與榮譽

應科院於是年內獲頒多個重要獎項與榮譽，充分顯示應科院的研發能力和員工的成就，得到海內外業界的認同。

應科院董事局獲香港董事學會頒發「2012傑出董事獎」榮譽。

材料與構裝技術群組副總裁及研發群組總監吳恩柏博士，獲廣東省半導體照明產業聯合創新中心選為LED行業十大風雲人物。

應科院首席科技總監任德盛教授，因其在通訊網絡的建構和資源管理方面貢獻良多，獲國際電機電子工程師學會（IEEE）頒授院士榮銜。

應科院和合作夥伴Active Learning Solutions (ALS) 公司共同開發的電子學習管理系統ALS系統，於二零一三年香港資訊及通訊科技獎獲最佳生活時尚獎（學習‧生活）金獎。

應科院合作夥伴沃露科技，以應科院授權技術開發出自供電智慧無線感測器，獲二零一三年香港資訊及通訊科技獎最佳綠色科技獎（創新）銀獎。*

應科院合作夥伴創毅微電子（香港）科技有限公司，獲香港創新科技及製造業聯合總會頒發FITMI創新科技成就大獎，以表揚該公司作為開發LTE TDD/FDD雙模終端SoC晶片的先驅。創毅的研發團隊成員主要由前應科院工程師組成。*

* 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

Portable Healthcare Electronics
便攜式醫療電子

ASTRI's smart reflective pulse oximeter for ubiquitous health monitoring is a portable device used to check user's wellness and sleeping quality on a continuous basis. Simply by placing a finger on the device, users can measure vital signs including pulse rate and pulse oximetry and the data can be sent wirelessly to smartphones or tablets for review and monitoring. The technology has been licensed to four healthcare equipment manufacturers in Hong Kong and the Mainland. Related healthcare devices are under mass production.

應科院研發的智慧型反射式脈搏血氧測量儀，是一款可用作持續檢查使用者身體健康情況及睡眠質素的便攜式醫療保健電子產品。使用者只須將手指放在測量儀上，便可即時量度重要的維生指數，包括脈搏和脈搏血氧飽和度。數據可以無線傳送至智能手機或平板電腦作分析和監控。該技術已授權給四家在香港和內地的醫療設備製造商，相關醫療設備正在量產中。

Concentrating photovoltaic module won GigaWatt Gold Award in the "Top 10 Highlights" competition held at the 6th International Solar Industry and Photovoltaic Exhibition and Conference (SNEC 2012).

應科院參與在上海舉辦的第六屆國際太陽能產業及光伏工程（上海）展覽會暨論壇（SNEC 2012），以自主研發的聚光式光伏（CPV）模組贏得大會的「十大亮點」吉瓦級金獎榮譽。

Wireless motion sensing module for LED Lighting System received Certificate of Merit, Best Green ICT (Innovation), Hong Kong ICT Awards 2013.

應科院利用LED燈光控制而開發的無線移動感應器模組，獲二零一三年香港資訊及通訊科技獎最佳綠色科技獎（創新）優異獎。

Indoor hybrid location tracking system won a Certificate of Merit in the Hong Kong RFID Awards 2012.

應科院室內混合式定位追蹤系統於二零一二年香港無線射頻識別大獎中獲得優異獎。

A research paper entitled "Mobile-Phone Antenna Design" co-authored by Mr. Corbett Rowell, R&D Director of ASTRI, ranked 25th in IEEE Xplore downloads two months after it was published in the August 2012 issue of Antennas and Propagation Magazine, a professional bimonthly journal by the Institute of Electrical and Electronics Engineers (IEEE).

由應科院研發總監柳江平合著題為「移動電話天線設計」的研究論文，在國際專業論文網站IEEE Xplore的下載次數位列二十五。該論文在國際電機電子工程師學會旗下一份雙月期刊《天線與傳播》的二零一二年八月號刊出，兩個月之後已錄得大量下載。

ASTRI showcased e-learning technologies at the 6th Electronics and Information Fair in Hangzhou and was given a special award "An Exhibitor Giving the Best of Experience to Visitors."

應科院在「第六屆中國杭州電子資訊博覽會」展示電子學習技術，獲頒「最佳體驗參展企業」獎。

Intelligent Lighting Sensor Module
智能燈光感應模組

This technology was transferred to eight companies in Hong Kong and the Mainland. This compact module, which is highly flexible and energy efficient, can be combined with RFID technology for use in security systems and energy-saving applications. The system has been put on trial in offices and public areas in Hong Kong and Shenzhen.
應科院已與八家香港及內地公司簽訂技術授權合約。此智能燈光感應模組不但體積小、耗電低，而且靈活性高，更可配合無線射頻技術，應用於保安系統及節能裝置。此智能燈光感應模組現正於香港和深圳一些公眾地方及辦公室試用。

Honours for ASTRI Annual Report

ASTRI's Annual Report 2011/12 themed "Connecting Minds for Innovations" received the following awards:

Gold Award (Non-profit Organization: Research Institute) in the 27th International ARC Awards Competition organized by MerComm, Inc.

Silver Award (Telecommunications) in 2012 LACP Vision Awards Competition organized by the League of American Communications Professionals (LACP). The publication was also selected by LACP as one of the "Top 50 Chinese Reports".

The Annual Report 2010/11 themed "Sparks of Innovations" received the following awards:

2011 LACP Vision Awards: Platinum Award (Technology, Semiconductor and Equipment) and Gold Award (Telecommunications).

Best New Entry in the 2012 HKMA Best Annual Reports Awards Competition organized by The Hong Kong Management Association.

應科院年報所得榮譽

以「才智匯聚，創科技先河」為主題的應科院二零一一／一二年報，榮獲以下獎項：

第廿十七屆國際 ARC Awards Competition 金獎 (非牟利機構：研究學院)，比賽由美國 MerComm, Inc. 主辦。

2012 LACP Vision Awards：最佳中文年報五十強，以及銀獎（電訊）。是項國際比賽由美國 League of American Communications Professionals（LACP）舉辦。

以「創意之源」為主題的應科院二零一零／一一年報，榮獲以下獎項：

2011 LACP Vision Awards：鉑金獎（科技‧半導體‧器材），以及金獎（電訊）。

在香港管理專業協會主辦的二零一二年最佳年報比賽中獲得「最優秀新參賽年報獎」。

Family Cloud Solution
家庭雲解決方案

The smart CE operating system developed by ASTRI was integrated by iPPea Ltd. into their family cloud solution AirPea™, which is expected to be launched in the market in the second quarter of 2013. AirPea™ enables users to transform a smartphone or tablet into a remote control for sharing music, videos and other infotainment contents with family members on a large TV screen.
易豆科技有限公司結合應科院的智能操作系統，開發出「跳豆」家庭雲解決方案，該產品預計在二零一三年第二季推出市場。利用「跳豆」，用戶可以將智能手機或平板電腦變成遙控器，與家庭成員在大電視屏幕上分享音樂、視象及其他資訊娛樂內容。

CORPORATE GOVERNANCE
企業管治

Board of Directors

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.

To achieve good governance, the Board with the support of Management, responds flexibly to, and reflects on, the changing terms and conditions of the business environment in which ASTRI operates, with key focus on the needs of the industrial sector.

The Board and Management adhere to ASTRI's four key management objectives: Transparency, Speed, User-friendliness and Governance.

董事局

董事局是應科院的管治組織,成員包括來自工商界、學術界及香港特區政府的代表。董事是由特區政府委任,負責領導應科院,制訂政策和發展路向。

為實施良好的管治,應科院董事局指示管理層須因應應科院的營商環境和條件的改變作出靈活應變,並以配合工業界需要為主要工作目標。

董事局和管理層堅持四個主要管理原則:透明度、效率、切合需要和管治。

Board Composition 董事局的組成

Chairman 主席
Dr. Patrick Wang Shui-chung, SBS, JP [1]
汪穗中博士,SBS,JP

Chairman and Chief Executive Officer, Johnson Electric Holdings Ltd.
德昌電機控股有限公司主席及行政總裁

Official Members 官守董事
Miss Susie Ho Shuk-yee, JP [2]
何淑兒女士,JP

Permanent Secretary for Commerce and Economic Development (Communications and Technology)
商務及經濟發展局常任秘書長(通訊及科技)

Miss Janet Wong Wing-chen, JP [3]
王榮珍女士,JP

Commissioner for Innovation and Technology
創新科技署署長

Members 董事

Mr. Anthony Au Wai-hung, BBS
區煒洪先生，**BBS**

Director,
Futuresuccess Consultants Ltd.
Futuresuccess Consultants Ltd. 董事

Mr. Christopher William Britton[4]
貝敦先生

Partner and Head of Intellectual Property Department,
Deacons
的近律師行合夥人及知識產權部主管

Prof. Andrew Chan Chi-fai, SBS, JP [14]
陳志輝教授，**SBS**，**JP**

Director, Executive MBA Programme,
The Chinese University of Hong Kong
香港中文大學行政人員工商管理碩士課程主任

Prof. Philip Chan Ching-ho, BBS [13]
陳正豪教授，**BBS**

Deputy President and Provost,
The Hong Kong Polytechnic University
香港理工大學常務及學務副校長

Mr. Cheng Cheuk-wing
鄭灼榮先生

CEO and President,
Appotech Ltd.
卓榮集成電路科技有限公司總裁

Prof. Roland Chin Tai-hong, BBS, JP [6]
錢大康教授，**BBS**，**JP**

Deputy Vice-Chancellor and Provost,
The University of Hong Kong
香港大學首席副校長

Prof. Ching Pak-chung, BBS
程伯中教授，**BBS**

Pro-Vice-Chancellor/Vice-President,
The Chinese University of Hong Kong
香港中文大學副校長

Mr. Humphrey Choi Chor-ching, JP [10]
蔡楚清先生，**JP**

Partner,
PricewaterhouseCoopers
羅兵咸永道會計師事務所合夥人

Mr. George Hongchoy Kwok-lung
王國龍先生

Executive Director and Chief Executive Officer,
The Link Management Ltd.
領匯管理有限公司執行董事兼行政總裁

Mr. Sunny Lee Wai-kwong, JP [7]
李惠光先生，**JP**

Vice-President (Administration),
City University of Hong Kong
香港城市大學副校長 (行政)

Dr. Tiger Lin Zhenhui
林振輝博士

Chairman and Chief Executive Officer,
China Mobile International Ltd.
中國移動國際有限公司董事長兼行政總裁

Ms. Agnes Nardi Kar-wai [9]
李家慧女士

Chief Executive Officer,
Business Environment Council Ltd.
商界環保協會有限公司行政總裁

Mr. Victor Ng Kwok-ho [8]
吳國豪先生

Managing Director,
Micom Tech Ltd.
捷訊電腦科技有限公司董事總經理

Dr. Franklin Tong Fuk-kay
湯復基博士

Vice President and CTO,
Hisense Broadband Multimedia Technologies Co. Ltd.
青島海信寬帶多媒體技術有限公司副總經理及首席技術官

Mr. Denis Tse Tik-yang [12]
謝迪洋先生

Head of Asia – Private Investments,
Lockheed Martin Investment Management Company
洛克希德馬汀投資管理亞洲私募投資主管

Mr. Luther Wong Lok-tak [11]
王樂得先生

Managing Director,
C&G Environmental Technology Ltd.
思捷環保科技有限公司行政總裁

Mr. Wong Ming-yam, BBS, JP [5]
王明鑫先生，**BBS**，**JP**

Director,
Top Brilliant Technology Ltd.
新璟陽企業發展集團有限公司董事

Key Management
Objectives
四個主要管理原則

Transparency
透明度

Speed
效率

User-friendliness
切合需要

Governance
管治

Functional Committees

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

功能委員會

董事也出任三個功能委員會，即財務與行政委員會、科技委員會及審計委員會的成員，以協助董事局管治應科院。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；審計委員會則確保適當執行內部及外部審計程序。以下是委員會的成員名單：

Board of Directors
董事局

Finance and Administration Committee
財務與行政委員會

Technology Committee
科技委員會

Audit Committee
審計委員會

Finance and Administration Committee
財務與行政委員會

Mr. Wong Ming-yam, BBS, JP (Chairman)
王明鑫先生，BBS，JP (主席)

Mr. Anthony Au Wai-hung, BBS
區煒洪先生，BBS

Ms. Agnes Nardi Kar-wai
李家慧女士

Dr. Franklin Tong Fuk-kay
湯復基博士

Mr. Denis Tse Tik-yang
謝迪洋先生

Mr. Luther Wong Lok-tak
王樂得先生

Miss Janet Wong Wing-chen, JP
王榮珍女士，JP

Audit Committee
審計委員會

Mr. Humphrey Choi Chor-ching, JP (Chairman)
蔡楚清先生，JP（主席）

Prof. Ching Pak-chung, BBS
程伯中教授，BBS

Mr. George Hongchoy Kwok-lung
王國龍先生

Mr. Victor Ng Kwok-ho
吳國豪先生

Miss Janet Wong Wing-chen, JP
王榮珍女士，JP

Technology Committee
科技委員會

Prof. Philip Chan Ching-ho, BBS (Chairman)
陳正豪教授，BBS（主席）

Mr. Anthony Au Wai-hung, BBS
區煒洪先生，BBS

Mr. Christopher William Britton
貝敦先生

Mr. Cheng Cheuk-wing
鄭灼榮先生

Prof. Roland Chin Tai-hong, BBS, JP
錢大康教授，BBS，JP

Prof. Ching Pak-chung, BBS
程伯中教授，BBS

Mr. Sunny Lee Wai-kwong, JP
李惠光先生，JP

Dr. Tiger Lin Zhenhui
林振輝博士

Ms. Agnes Nardi Kar-wai
李家慧女士

Mr. Victor Ng Kwok-ho
吳國豪先生

Dr. Franklin Tong Fuk-kay
湯復基博士

Mr. Denis Tse Tik-yang
謝迪洋先生

Mr. Wong Ming-yam, BBS, JP
王明鑫先生，BBS，JP

Miss Janet Wong Wing-chen, JP
王榮珍女士，JP

Meetings and Attendance

The Board and the Functional Committees convene meetings on a regular basis. Special meetings will be held as and when necessary. The following is attendance record of Board and Functional Committee meetings held during the year.

會議及出席率

董事局及功能委員會定期舉行會議，並於有需要時召開特別會議。以下是董事局會議及各功能委員會會議的出席紀錄。

Board Meetings	董事局會議	27/06/2012	21/09/2012	14/12/2012
Total no. of directors during the period	期內董事局成員人數	20	19	20
Total no. of directors present at meeting	董事出席人數	18	14	17
Total no. of apologies	缺席人數	2	5	3
Group attendance in percentage	出席率	90%	74%	85%

FAC Meetings	財務與行政委員會會議	05/06/2012	27/08/2012	22/11/2012	05/03/2013
Total no. of directors during the period	期內委員會成員人數	6	6	7	7
Total no. of directors present at meeting	董事出席人數	3	6	6	4
Total no. of apologies	缺席人數	3	0	1	3
Group attendance in percentage	出席率	50%	100%	86%	57%

TC Meetings	科技委員會會議	13/06/2012	06/09/2012	03/12/2012	20/03/2013
Total no. of directors during the period	期內委員會成員人數	14	14	14	14
Total no. of directors present at meeting	董事出席人數	8	10	9	11
Total no. of apologies	缺席人數	6	4	5	3
Group attendance in percentage	出席率	57%	71%	64%	79%

AC Meetings	審計委員會會議	11/06/2012	07/09/2012	30/11/2012	21/03/2013
Total no. of directors during the period	期內委員會成員人數	6	6	5	5
Total no. of directors present at meeting	董事出席人數	5	4	4	5
Total no. of apologies	缺席人數	1	2	1	0
Group attendance in percentage	出席率	83%	67%	80%	100%

Movements of Directors 董事局成員變動

New Directors 新委任董事	Appointed Date 委任日期
Mr. Christopher William Britton 貝敦先生	7 November, 2012 二零一二年十一月七日
Prof. Roland Chin Tai-hong, BBS, JP 錢大康教授，BBS，JP	21 October, 2012 二零一二年十月二十一日
Mr. Humphrey Choi Chor-ching, JP 蔡楚清先生，JP	21 October, 2012 二零一二年十月二十一日
Miss Susie Ho Shuk-yee, JP (Official) 何淑兒女士，JP（官守）	15 October, 2012 二零一二年十月十五日
Mr. Sunny Lee Wai-kwong, JP 李惠光先生，JP	21 October, 2012 二零一二年十月二十一日
Dr. Tiger Lin Zhenhui 林振輝博士	7 November, 2012 二零一二年十一月七日
Mr. Denis Tse Tik-yang 謝迪洋先生	21 October, 2012 二零一二年十月二十一日
Mr. Wong Ming-yam, BBS, JP 王明鑫先生，BBS，JP	21 October, 2012 二零一二年十月二十一日

Retired Directors 退任董事	Date of Retirement 退任日期
Dr. Sunny Chai Ngai-chiu 查毅超博士	21 October, 2012 二零一二年十月二十一日
Prof. Chew Weng-cho 周永祖教授	21 October, 2012 二零一二年十月二十一日
Dr. Patrick Lam See-pong 林師龐博士	21 October, 2012 二零一二年十月二十一日
Mr. Henry Leung Kwong-han 梁廣恒先生	21 October, 2012 二零一二年十月二十一日
Dr. Humphrey Leung Kwong-wai 梁廣偉博士	21 October, 2012 二零一二年十月二十一日
Mr. Richard Sun Po-yuen, JP 孫寶源先生，JP	21 October, 2012 二零一二年十月二十一日
Miss Elizabeth Tse Man-yee, JP (Official) 謝曼怡女士，JP（官守）	25 July, 2012 二零一二年七月二十五日
Mr. Peter Wong King-fai 黃景輝先生	21 October, 2012 二零一二年十月二十一日

Alternate Directors 替代董事	Appointment Status 委任狀況
Mr. Andrew Lai Chi-wah, JP 黎志華先生，JP	Retired on 5 April, 2012 as alternate to Miss Janet Wong Wing-chen, JP 二零一二年四月五日退任替代王榮珍女士，JP
Mr. Johann Wong Chung-yan 黃宗殷先生	Appointed on 19 April, 2012 as alternate to Miss Janet Wong Wing-chen, JP 二零一二年四月十九日獲委任替代王榮珍女士，JP
Miss Janet Wong Wing-chen, JP (Official) 王榮珍女士，JP（官守）	Retired on 25 July, 2012 as alternate to Miss Elizabeth Tse Man-yee, JP 二零一二年七月二十五日退任替代謝曼怡女士，JP Appointed on 15 October, 2012 as alternate to Miss Susie Ho Shuk-yee, JP 二零一二年十月十五日獲委任替代何淑兒女士，JP

Corporate Governance Manual

ASTRI has adopted a Corporate Governance Manual which clearly states ASTRI's policies and principles in achieving good governance. The Manual has facilitated the Board and Management to operate and oversee ASTRI's business in a transparent and accountable manner.

In past years, sections of the Manual were updated and modified, taking into account changes and developments required for improving ASTRI's operation, as well as responding flexibly to, and reflecting on, the changing terms and conditions of the business environment in which ASTRI operates.

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

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 authority 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, the Manual also included sections on "IP Portfolio Management", "Technology Transfer" and "R&D Project Management and Process", providing the latest policies and guidelines in these important areas.

Furthermore, to efficiently exercise good corporate governance, an Internal Audit Department under the Audit Committee was set up in 2003 to assist the Board by providing it with 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, biannual Internal Audit Progress Reports will be presented to the Audit Committee.

企業管治手冊

應科院已制定企業管治手冊，清楚列明達致優良管治的政策和原則，以協助董事局和管理層以高透明度和負責任地經營及監督應科院的業務。

過去數年間，企業管治手冊中多個段落已有所更新，把對改善應科院運作所必要的轉變和發展涵蓋在內，及對應科院所處的營運環境的轉變作靈活的應對和考量。

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

有關「應科院經常性撥款的財務管理」以及「貨品與服務購置」的政策和指引亦清楚寫明於手冊內；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，手冊也加入了「知識產權組合管理」、「技術轉移」以及「研發項目管理及流程」等欄目，提供這些重要範疇的最新政策和指引。

另外，為有效進行良好的企業管治，應科院於二零零三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。

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.

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、運作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。

Planning and Monitoring

Under the theme "customer-focused R&D", ASTRI aims at maximizing R&D impact on customers and converting research into real results. The latter is a systematic process building customer focus 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.

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

策劃與監察

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各研發項目的每一環節每一步驟，由研究計劃開始直至將所研發的知識產權轉移至客戶。除了不斷努力研發世界級知識產權及將其轉移給業界外，應科院對確保其研究和管理過程的質素也非常重視。

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：

Step 步驟 1
Annual update of ASTRI's Five-year Plan in October
每年十月更新應科院的五年計劃

Step 步驟 2
Review Key Technology Initiatives by ASTRI's Domain Advisory Committees comprising local industry and academic leaders
由本地業界及學術領袖組成的應科院研發領域顧問委員會檢討重點研發項目

Step 步驟 3
Review ASTRI's overall strategy and its execution by ASTRI's Technology Advisory Committee comprising world-renowned international technology experts
由世界知名的國際科技專家組成的應科院科技顧問委員會檢討應科院的整體策略及其執行情況

Step 步驟 4
ASTRI Board's review and approval
由應科院董事局審閱及批核

This process is also adopted for vetting and monitoring all ongoing R&D projects, which are reviewed by the Board between six and nine months from project commencement to evaluate effectiveness of customer engagement. Biannual reports are submitted to the Innovation and Technology Commission to examine project progress against stated milestones. The projects are also subjected 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。董事局的科技委員會並會於每季審核各項目，而應科院的首席科技總監會監察各項目每月的進度。

Focusing on improving patent quality to increase financial returns, ASTRI adopts a balanced measure that includes the number of patent applications filed, successful granting rate of patents and income from patent licensing to gauge success of its R&D output. A report on the commercialization status of all pending and granted patents is submitted to the Technology Committee every six months.

During the year under review, a Review Committee was specially formed to take an in-depth look at ASTRI's performance over the past years and make recommendations for improvement. The committee comprised Government officials, external stake holders, past and current ASTRI Board members and members of senior management. Four working groups were formed to focus on topics including (1) review of past performance of ASTRI; (2) industry contributions; (3) customers' expectations of ASTRI/commercialization; and (4) cultural and performance appraisal system.

Following the Board's decision that ASTRI should elevate efforts to create well-conceived spin-offs from its R&D operation, a special committee was set up during the year to map out strategies and oversee their execution. Chaired by a Board Director, the committee includes members from the Board, senior management, Innovation and Technology Commission and local industry.

Target Setting, Risk Management and Control

The Board in 2011 adopted new measures to further upgrade management quality in planning and control. The Balanced Scorecard was introduced to provide a framework for different functional units to operate towards comprehensible targets.

Furthermore, under the direction and guidance of the Board via the Audit Committee, Management and the Internal Audit Department conducted a company-wide Risk Profiling and Assessment exercise in 2010. As a result, several high risk areas were identified prompting Management to take action ensuring preventive controls were in place to manage them. A Preliminary Risk Register was formulated and an update was conducted in 2013 to further enhance effective governance of ASTRI.

應科院管理層著重透過提升專利質素來增加收入，採用多個合理指標以評估研發成果的成績，其中包括申請專利數目、成功獲批專利比率及專利授權收入等。而所有申請中或已獲批專利的商品化情況，也會每六個月向科技委員會呈報。

在本財政年度，一個檢討委員會特別成立，檢視應科院過往幾年的工作，並提出改進的建議。委員會由政府官員、持份者、本院過去及現任董事，以及高層管理人員組成，轄下有四個小組，研究的議題包括（一）應科院過往業績；（二）從業界所得收入；（三）客戶對本院商業化的期望；及（四）文化和績效考核制度。

董事局決定應科院應著力從其研發營運中周密地創建分拆公司，年內成立了一個特別委員會，訂立策略和監督執行。委員會由一位董事出任主席，委員來自董事局、應科院管理層、創新科技署以及本地業界。

目標訂定、風險管理和控制

在二零一一年，董事局實施了新措施，以進一步提升應科院在策劃和控制等方面的管理質素。平衡計分卡為不同職能部門提供了框架，讓它們朝著清晰明確的目標運作。

此外，管理層和內部審計部門在董事局通過審計委員會指導下，於二零一零年進行了一項全公司的風險描述與評估的工作，辨別出幾個高風險範疇，管理層也採取了行動確保防範性的控制措施已準備就緒，以應付該些風險。「初步風險登記冊」已擬備，並於二零一三年更新，以進一步增強應科院有效的管治。

Quality Management System

ASTRI obtained certification compliant to ISO 9001:2008 standard a few years ago. We are now renewing efforts to further enhance quality management. The four essential objectives for ASTRI's ISO-based management system are Transparency, Speed, User-friendliness and Governance.

Following the Board's decision to resume ISO 9001 certification, ASTRI developed a quality management system aimed at increasing customer satisfaction and work efficiency.

品質管理系統

應科院於多年前曾取得 ISO 9001:2008 管理程序標準認證，現正進行更新程序。應科院以國際標準化組織（ISO）為基礎的管理系統的四大目標為透明度、效率、切合需要和管治。

隨著董事局決定重新啟動ISO 9001 認證程序，應科院確立了一套品質管理系統，務求提升顧客滿意度和工作效率。

Five stages for achieving ISO 9001 Certification
為取得 ISO 9001 認證而訂立的五個步驟

Step 步驟 1
Awareness and Planning
意識及計劃

Step 步驟 2
Review and Assessment
審查及評核

Step 步驟 3
Development
發展

Step 步驟 4
Implementation and Verification
實行及鑑定

Step 步驟 5
Certification
認證

In Stage One, a task force headed by top management and comprising the Quality Management Manager, department functional managers, ISO auditors and consultants from an external ISO consultancy company was formed to implement the ISO programme. Subsequently, the implementation roadmap, benefits, schedule and the task force structure were communicated to ASTRI staff, and members of the task force were given comprehensive training on the ISO 9001 requirements.

In Stage Two, a comprehensive assessment of ASTRI's operation was conducted by the external ISO consultancy company to identify gaps and improvement areas for the system. An action plan was then formulated.

在第一階段，應科院組成由品質控制經理、各部門職能經理和ISO審計員，以及一間外聘的ISO顧問公司組成的工作組，在最高管理層領導下執行ISO計劃。及後，院方向員工解釋了實踐ISO 9001的路線圖、益處、時間表和工作組架構；工作組成員也接受了全面的培訓，瞭解ISO 9001的要求。

在第二階段，ISO顧問公司對應科院的運作做了全面評估，辨識系統的缺失和可改善之處。行動計劃隨即擬定。

In Stage Three, the ISO procedures and guidelines were prepared by functional managers and reviewed by the consultancy company. Subsequently, the consultants met representatives of the R&D domains to finalize the ISO documents before submitting them to Management for endorsement and approval.

In Stage Four, a series of company-wide training on ISO 9001's basic requirements as well as ASTRI's quality policy and objectives were conducted to elevate staff's quality awareness. Furthermore, the consultant representatives met monthly with functional managers and project leaders of R&D domains to review implementation records and resolve any related issues. Customer feedback was also collected by using survey questionnaires after completion of each R&D project.

In March 2013, a team of ISO auditors performed internal quality audit on all departments and groups to determine whether the implementation conformed to the ISO 9001 requirements. Areas for continuous improvement were identified.

Looking forward, ASTRI will maintain the momentum in implementing on schedule the ISO 9001 quality management system, and be prepared to handle external pre-audit and certification audit processes. It will harvest ISO 9001 benefits to achieve efficiency and quality for improving business operation.

Health and Safety

With support from the Board and Management in providing a safe, healthy and respectful workplace for staff, a Health and Safety Committee was set up in February 2011. The Committee, comprising members from different departments and research groups, provided a platform for Management and staff to share views and make decisions on issues relating to safety and health.

在第三階段，職能經理準備ISO程序和指引，經由顧問公司審查。其後，顧問公司與研發組別的代表會面，釐清疑問，按需要更正ISO文件，然後呈交予最高管理層認可和批准。

在第四階段，院方就有關ISO 9001基本要求及應科院品質政策和目標，舉辦了一系列全公司培訓，以提升員工對品質的意識和認識。此外，顧問公司每月與職能經理及研發部門項目負責人會面，審查執行紀錄，解決有關問題。院方也在每個研發項目完成之後向客戶寄出調查問卷，蒐集客戶反饋。

在二零一三年三月，一隊ISO審計員向所有部門和群組作了內部品質審計，判定計劃的執行是否符合ISO 9001的要求，指出了須作持續改進的範疇。

展望將來，應科院將努力不懈，根據既定的時間表實行ISO 9001品質管理系統，並準備應付外部前期審計及認證審計等程序。應科院將得益於ISO 9001，改善營運的效率和品質。

健康與安全

董事局和管理層亦致力為應科院員工提供安全、健康及彼此尊重的工作環境，於二零一一年二月成立由不同部門和研發群組員工組成的健康與安全委員會，為管理層和職員提供一個平台，就有關安全與健康的議題交換意見及作出決定。

ISO 9001 Certification
ISO 9001 認證

With advice from the Committee, an Occupational Safety and Health (OSH) Manual was published providing guidance on planning and procedures pertaining to work safety and health. Regular inspections were conducted with laboratory representatives to ensure the plan and procedures were put into practice in the workplace. Furthermore, training in chemical substance management, building fire safety, office ergonomics, and so on, were provided to cultivate safety awareness and ensure good safety practice is a working norm at ASTRI. An e-Learning platform was made available for all staff to take part in OSH training at their convenience.

To further encourage staff participation in OSH, an on-line forum was set up in the staff community portal for all ASTRI employees to share opinions on safety practices.

Business Ethics and Law

It is believed that a good understanding of business ethics is fundamental in making ASTRI a virtuous organization enabling it to supply talent with high integrity to industry. A series of mandatory workshops on Business Ethics and Law was organized for Management and staff at the end of 2011. The contents covered the basic concept of business ethics and the requirement of ASTRI employees to participate in business activities as ethically responsible members of the Institute.

In June 2012, ASTRI became a public body after being included in Schedule 1 of the Prevention of Bribery Ordinance (POBO). Subsequently, ICAC personnel conducted mandatory training sessions for all ASTRI employees fully briefing them on the POBO, the ICAC Ordinance, conflict of interest issues and ICAC services.

一份職業安全及健康手冊已按委員會的建議印備,為有關工作安全及健康的計劃和程序提供指引。健康及安全檢查定期進行;員工也提名了實驗室代表把有關措施在工作間落實。同時,管理層為員工安排了化學品管理、樓宇防火、辦公室人體工學等訓練,增強各人安全意識,並確保良好的安全習慣成為應科院的作業常規。一個電子學習平台也為全體員工準備妥當,以便他們參加職業安全及健康培訓。

為進一步鼓勵員工投入職業安全與健康,一個網上討論區已在員工社區門戶網內建立,讓所有應科院僱員就安全操作分享意見。

商業道德和法例

應科院相信,要成為一所負責任的機構,員工應對商業道德有良好的理解,這也有助應科院為業界培育出專業和守法的人才。由此,應科院於二零一一年年底為管理層及所有員工安排了一系列關於商業道德和法例的強制性工作坊,並邀得一位香港中文大學法律學院講師主講,內容涵蓋商業道德的基本概念,和解釋對應科院僱員參與商業活動時的道德責任。

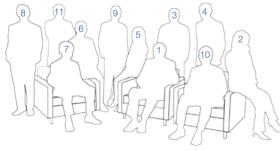二零一二年六月,應科院被納入「防止賄賂條例」附表一,成為一所公共機構。其後,廉政公署人員為所有應科院僱員舉行了強制性培訓講座,透徹地講解了防止賄賂條例、廉政公署條例、利益衝突問題和廉政公署服務。

TALENTED TEAMS
VIBRANT CREATIVITIES

人才濟濟 創意澎湃

MANAGEMENT
高級行政人員

ASTRI is headed by a Chief Executive Officer (CEO) who is responsible to the Board of Directors for the company's overall management. He is assisted by the R&D Vice Presidents, as well as senior executives at headquarters who are responsible for administrative, financial, commercial and other supporting functions.

應科院由行政總裁負責整體管理工作，並向董事局負責。行政總裁旗下有副總裁及研發群組總監，負責領導研究工作；以及總部高級管理人員，負責行政管理、財務、商務及其他支援性職責。

As at 31 March, 2013
截至二零一三年三月三十一日

Chief Executive Officer 行政總裁

Dr. Cheung Nim-kwan [1]
張念坤博士

Headquarters 總部

Prof. Peter Yum, Chief Technology Officer
首席科技總監 任德盛教授

Mr. David Poon, Vice President, Corporate Communications and Company Secretary [3]
副總裁(傳訊)及公司秘書 潘占達先生

Ms. Ivy Leung, Human Resources Director [5]
人力資源總監 梁穎莊女士

Ms. Betty Law, Chief Financial Officer [2]
首席財務總監 羅翠萍女士

Mr. Keith Poon, Vice President, Marketing and Commercialization [4]
副總裁（市場及商務）潘志明先生

R&D Groups and Teams 研發群組及小組

Dr. Justin Chuang, Vice President and Group Director,
Communications Technologies Group [6]
通訊技術群組 副總裁及研發群組總監
莊哲義博士

Dr. Chao Shen-chang, Vice President and
Group Director, Enterprise & Consumer Electronics Group [8]
企業與消費電子群組 副總裁及研發群組總監
趙盛章博士

Dr. Wang Keh-chung, Vice President and
Group Director, IC Design Group [10]
集成電路設計群組 副總裁及研發群組總監
王克中博士

Dr. Wu Enboa, Vice President and Group Director,
Material & Packaging Technologies Group [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

Dr. Francis Lee, Vice President and R&D Director,
Bio-Medical Electronics Team [9]
生物醫學電子組 副總裁及研發總監
李致淳博士

Dr. Lo Tak-sing, Director, Exploratory Research Laboratory [11]
信息研究室 總監
盧德星博士

Annual Remuneration of Senior Executives 高級行政人員薪酬

		Annual Remuneration (HK$M) 1 April, 2012 – 31 March, 2013 由二零一二年四月一日至二零一三年三月三十一日
Post	**職級**	**全年薪酬（百萬港元）**
Chief Executive Officer	行政總裁	3.5
6 Level One Executives	六名一級員工	13.7
19 Level Two Executives	十九名二級員工	24.9

**Annual Remuneration
1 April, 2012 – 31 March, 2013 (HK$)
由二零一二年四月一日至
二零一三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	2
1,000,001 – 1,500,000	12
1,500,001 – 2,000,000	4
2,000,001 – 2,500,000	7
2,500,001 – 3,000,000	0
3,000,001 – 3,500,000	1
3,500,001 – 4,000,000	0

A PROFESSIONAL TEAM
專業團隊

ASTRI builds its strengths on people. The workforce comprises teams of talented and dedicated professionals with good academic background and exposure in Hong Kong, the Mainland and the world. A majority of our staff, over 84 per cent, is involved in R&D work focusing on various technologies of their expertise. The following is the profile of ASTRI's people in the year under review.
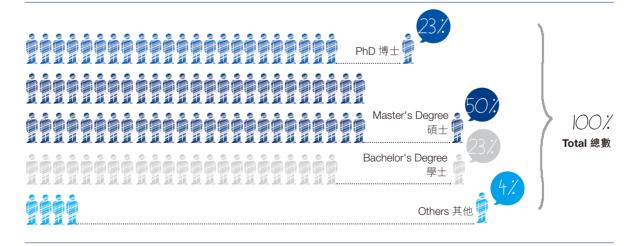
人才是應科院的重要發展支柱。本院的人力資源主要由擁有良好教育背景及豐富工作經驗的專業人士組成，包括來自香港、中國內地及世界各地的人才。科技人員佔整體員工百份之八十四以上，負責不同科技領域的研發工作。以下是本院過去一年有關人力資源的一些現況。

Headcount Status 員工人數

		As at 31 March, 2013 截至二零一三年 三月三十一日	As at 31 March, 2012 截至二零一二年 三月三十一日
Headquarters	**總部**	**87**	**85**
R&D Group	**研發群組**		
● Communications Technologies	通訊技術	90	117
● Enterprise & Consumer Electronics	企業與消費電子	100	126
● IC Design	集成電路設計	112	96
● Material & Packaging Technologies	材料與構裝技術	118	121
● Bio-Medical Electronics (Team)	生物醫學電子（組）	21	16
● Exploratory Research Laboratory (Team)	信息研究室（組）	6	6
● Interns	實習研究員	27	19
Sub-total	**小計**	**474**	**501**
Total	**總數**	**561**	**586**

Staff Academic Qualifications 員工學歷

As at 31 March, 2013
Including R&D and non-R&D staff but excluding interns
截至二零一三年三月三十一日
包括研發人員、非研發人員，
但不包括實習研究員

PhD 博士 **23%**

Master's Degree 碩士 **50%**

Bachelor's Degree 學士 **23%**

Others 其他 **4%**

100% Total 總數

Nurturing Talent

Nurturing new talent for the industry and cultivating the younger generation's interests in R&D are ASTRI's priorities in people management. ASTRI continued to attract new talent through open recruitment, career talks, exhibitions and internship programmes.

Besides holding talks at local universities to introduce ASTRI and applied R&D, ASTRI also took part in The University of Hong Kong Postgraduate Career Day to give presentations, host exhibition and round-table sessions with prospective interns and employees, drawing the attention of a large group of participants.

ASTRI also continued to offer internship opportunities to local university graduates through the internship programme funded by the Innovation and Technology Commission. The programme allows young people aspiring to become research scientists and engineers to gain exposure and acquire training from the wide spectrum of high standard research projects at ASTRI. A total of 27 project interns joined ASTRI through the programme this year. Some of them were offered engineering positions even before they completed their internship.

培育人才

為業界培育新一代人才及培養他們對科研的興趣,是應科院人力資源管理的首要目的之一。年內,應科院繼續透過公開招聘、就業講座、展覽及實習員計劃來吸引人才加入本院工作。

除了在本港幾間大學校園舉行講座,介紹應科院和應用科技,本院還參加了香港大學研究生就業諮詢日。透過發表演講、舉行展覽和主持圓桌會議,與有興趣加入應科院作全職研究員或實習研究員的同學交談,是日活動吸引了大批學生參加。

應科院也透過創新科技署資助的實習研究員計劃,繼續為本地大學生提供實習機會。該計劃讓有志成為研究科學家或工程師的年青人,藉著參與本院高水平及範圍廣泛的研究工作,從中獲取經驗和培訓。今年本院共聘用了二十七位實習研究員,部份在完成實習之前已獲聘任為工程師。

ASTRI summer interns 2012
應科院二零一二年暑期實習研究員

Getting to know each other during career day
本院高管於就業諮詢日與學生會面交流

The Summer Internship Programme was again successfully organized with 30 science and engineering students from local and overseas universities spending their summer at ASTRI and gaining hands-on research experience. Besides Hong Kong students from top universities, students from renowned universities in England and U.S., including Cambridge University, Imperial College London, Princeton University, Purdue University and University of California, Los Angeles joined the internship.

此外,暑期實習研究員計劃也再度成功舉辦。今年共有三十位本港和海外的理科及工程系學生參加暑期實習,從中吸取實際科研工作經驗。參加者除了來本地幾間頂尖大學,也有來自海外著名學府如劍橋大學、倫敦帝國學院、普林斯頓大學、普度大學和加州大學洛杉磯分校的學生。

HONOURS FOR STAFF
員工的榮譽

At ASTRI, we take immense pride in our staff's successes and achievements. ASTRI won a number of prestigious accolades and awards both locally and internationally during the year, reflecting our staff's capabilities in conveying state-of-the-art technologies to industry and community.

應科院以員工的成功為驕傲。本院在是年內贏得多項本地及國際榮譽和獎項，足以證明應科院員工的研發能力及其為業界及社會開創的先進科技，已獲外界肯定。

LED Industry Billboard Awards "Top Ten Persons of the Year"

Dr. Wu Enboa, Vice President and Group Director, Material and Packaging Technologies Group, was named one of the "Top Ten Persons of the Year" in the LED Industry Billboard Awards for the contributions and influence he brought to the LED industry. The Billboard Awards was jointly organized by China Shenzhen LED Industry Association and Guangdong LED Magazine. Experts from research institutions, academia, enterprises and associations of the LED industry formed the judging panel.

LED 行業十大風雲人物

材料與構裝技術群組副總裁及研發群組總監吳恩柏博士，於廣東省半導體照明產業聯合創新中心與《廣東LED》雜誌社合辦的「LED行業風雲榜」中，因其對LED產業作出的貢獻和影響力而獲選為LED行業十大風雲人物。此獎項的評選委員會由研究院、高校、企業、LED行業和協會等多名專家組成。

Dr. Wu (sixth from left) with other title winners at the award presentation ceremony
吳博士（左六）於頒獎禮上與其他得獎者合攝

Hong Kong ICT Awards 2013
Gold Award, Best Lifestyle (Learning and Living)

The ALS System jointly developed by ASTRI and Active Learning Solutions Limited won this award. ALS is a system for managing e-learning activities and devices in the classroom to facilitate the paradigm shift from the traditional teacher-centric learning to student-centric learning, stimulating student interest in learning as well as improving teaching efficiency and effectiveness.

二零一三年香港資訊及通訊科技獎
最佳生活時尚獎（學習．生活）金獎

應科院與Active Learning Solutions (ALS)公司共同開發的ALS系統榮獲此獎項。該系統是一套綜合管理課堂電子學習活動和儀器的系統，有助改變傳統的教學模式，從以老師為中心轉變為以學生為中心的互動學習。系統有助提升學生的學習興趣，促進教與學的成效。

Members of the ASTRI team and Active Learning Solutions Limited at the award presentation ceremony
獲獎團隊與合作夥伴於頒獎典禮上合照

Winning Team 獲獎團隊

Dr. Edward Lor, Deputy R&D Director, Project Coordination
羅家泳博士，副研發總監，負責項目統籌

Mr. Andrew Sze, Senior Engineer, Project Management and Feature Requirement
時浩邦先生，高級工程師，負責項目管理及產品需求

Mr. Fang Laifa, Principal Engineer, Software Architecture and Development Lead
方來發先生，主任工程師，負責軟體架構及開發領導

Ms. Kam Yuk-ching, Principal Researcher, Customer Interface and Education Adviser
甘玉貞女士，主任研究員，負責用戶接口及教育顧問

Mr. Zou Qiangqi, Senior Engineer, Client Application Software Development
鄒戧祁先生，高級工程師，負責客戶端應用軟件開發

Mr. Au Wing-hei, Senior Engineer, Client Platform Software Development
歐穎僖先生，高級工程師，負責客戶端平台軟件開發

Ms. Vivian Wang, Engineer, Server Platform Software Development
王媛媛女士，工程師，負責伺服器平台軟件開發

Mr. Ken Yau, Engineer, Quality Assurance
游文耀先生，工程師，負責質量保證

Hong Kong Federation of Innovative Technologies and Manufacturing Industries (FITMI) Innovative Technology Achievement Award 2012

ASTRI's partner Innofidei (Hong Kong) Technology Limited won this award with their pioneer work in developing LTE TDD/FDD dual-mode terminal SoC chipset. ASTRI and Innofidel started collaboration in developing LTE related technologies in 2008. ASTRI exclusively licensed the embedded DSP and L1 control software of UE baseband technology to Innofidei in 2012. A group of engineers who formerly worked at ASTRI later joined Innofidei and became core members in their research team.

Innofidei Corporation's Founder and Board Chairman Dr. Tom Zhang (third from left) and ASTRI Vice President and Group Director Dr. Justin Chuang (second from left) at the presentation ceremony
北京創毅訊聯科技股份有限公司創辦人兼董事長張輝博士（左三）及應科院副總裁及研發群組總監莊哲義博士（左二）於頒獎禮上接受獎座

二零一二年香港創新科技及製造業聯合總會「創新科技成就大獎」

應科院的合作夥伴創毅微電子（香港）科技有限公司，因開發LTE TDD/FDD雙模終端SoC晶片的先導工作而獲此殊榮。應科院與創毅早於二零零八年便開始合作開發LTE相關技術。創毅並於二零一二年獲本院獨家授權終端基帶技術的嵌入式DSP和L1控制軟件。其後本院一組工程師便加盟了創毅，成為他們研發團隊的要員。

Hong Kong ICT Awards 2013
Silver Award, Best Green ICT (Innovation)

ASTRI and partner Voloe Technology won this award with the jointly developed green power smart wireless sensor. This sensor allows thermoelectric energy harvesting to provide a self-powered and maintenance free solution for ubiquitous condition monitoring, which is ideal for applications in consumer electronics and industrial machinery.

二零一三年香港資訊及通訊科技獎最佳綠色科技獎（創新）銀獎

應科院與沃露科技合作研發的自供電智慧無線感測器獲得此獎項。該感測器使用溫差發電模組供電，為全環境持續監控提供一個採用綠色供電而免維護的解決方案，適用於消費電子及工業機械。

Winning Team 獲獎團隊

Dr. Ivan Sham, Senior Manager, Technology and Team Development, and Project Management
沈文龍博士，高級經理，負責技術與團隊發展及項目管理

Dr. Gao Ziyang, Principal Engineer, Key Technology Development
高子陽博士，主任工程師，負責關鍵技術發展

Mr. Jeff Xie, Engineer, Project Implementation
謝開旺先生，工程師，負責項目實施

The 6th International Solar Industry and Photovoltaic Exhibition and Conference (SNEC 2012) "Top 10 Highlights" GigaWatt Gold Award

ASTRI's concentrating photovoltaic (CPV) module combines innovative optical design and low-thermal resistance solar cell package technology to deliver exceptional performance in generating solar energy. Its unique all-glass optics design enables a greener environment, offering enhanced reliability and sustainability in terms of energy solutions at a comparatively affordable cost.

Winning Team 獲獎團隊

Dr. Zhou Wei, Manager, Project Management
周偉博士，經理，負責項目管理

Dr. Huang Xuyan, Senior Engineer, Mechanical and Thermal Design
黃旭艷博士，高級工程師，負責機械及散熱設計

Dr. Xu Hong, Senior Engineer, Optical Design
許洪博士，高級工程師，負責光學設計

Mr. Li Zhongshi, Engineer, Solar Energy Testing
李忠實先生，工程師，負責太陽能測試

Mr. Wang Xiaokai, Engineer, Mechanical and Packaging
王曉凱先生，工程師，負責機械和構裝

第六屆國際太陽能產業及光伏工程（上海）展覽會暨論壇「十大亮點」吉瓦級金獎

應科院自主研發的聚光式光伏模組結合了新穎的光學設計以及低熱阻光伏電池構裝技術，能提供卓越的太陽能能源方案。其獨有的全玻璃光學元件有助綠化環境，並提供低成本、高可靠性及可持續發展的能源解決方案。

ASTRI and Voloe Technology representatives at the award presentation ceremony
應科院與沃露科技代表於頒獎禮上合攝

Hong Kong ICT Awards 2013
Certificate of Merit, Best Green ICT (Innovation)

ASTRI won this award with its wireless motion sensing module for LED lighting system, developed by using a wireless communication module to provide Doppler (motion) sensing and wireless lighting control. It is compact, energy efficient and highly flexible. When combined with RFID technology, it can be used in security systems and energy saving applications.

二零一三年香港資訊及通訊科技獎最佳綠色科技獎（創新）優異獎

應科院開發的用於LED照明系統的無線移動感應器模組獲得此獎項。此模組利用無線通訊技術來提供移動感應和無線燈控功能。它不但體積小、耗電低，而且靈活性高，更可配合無線射頻技術，應用於保安系統及節能裝置。

Winning Team 獲獎團隊

Mr. Jacky Leung, Technical Manager, Project Management
梁振佳先生，技術經理，負責項目管理

Mr. Matthew Wong, Principal Engineer, Algorithm Development
黃家敬先生，主任工程師，負責算法設計

Dr. Tony Lo, Senior Engineer, RF Design
盧偉強博士，高級工程師，負責射頻設計

Mr. Tony Chau, Senior Engineer, Firmware Development
周延政先生，高級工程師，負責韌體設計

Mr. Bruce Lam, Senior Engineer, Hardware Design
林寶樹先生，高級工程師，負責硬件設計

Mr. Dickson Leung, Engineer, System Testing
梁狄信先生，工程師，負責系統測試

Mr. Beh Kuang Boon, Engineer, Software Development
馬廣汶先生，工程師，負責軟件開發

Mr. Jacky Leung (second from right) and team members receiving the award
梁振佳先生(右二) 與隊員
接受獎狀

Hong Kong RFID Awards 2012
Certificate of Merit

ASTRI's indoor hybrid mode location tracking system won this award. Real-time location tracking is realized by hybrid technologies including VLC and RF which reduce cost, operating power and enhances reliability. The system has wide applications such as patient, staff and equipment tracking in hospitals or elderly homes, security systems in commercial buildings and logistics management in warehouses.

二零一二年「香港無線射頻識別大獎」優異獎

獲獎的室內混合式定位追踪系統使用光學傳輸和無線射頻網絡等混合式技術，以節省成本和用電量，並提高可靠性。該系統用途非常廣泛，例如可在護老院及醫院使用來追踪醫護人員、病人及儀器所在位置、大廈保安、倉庫及物流管理等。

Mr. Jacky Leung (right) on behalf of the team receiving the award from Mr. Anthony Tan, CEO of Hong Kong Science and Technology Parks Corporation
梁振佳先生(右)代表研發團隊，從香港科技園公司行政總裁陳蔭楠先生手中接過領獎

Winning Team 獲獎團隊

Mr. Jacky Leung, Technical Manager, Project Management
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Mr. Beh Kuang Boon, Engineer, Software Development
馬廣汶先生，工程師，負責軟件開發

EXTERNAL APPOINTMENTS
外界任命

The following are external appointments held by senior ASTRI staff for the period 1 April, 2012 to 31 March, 2013.

下列為高級員工於二零一二年三月三十一日至二零一三年四月一日期間擔任的外界職務。

Dr. Cheung Nim-kwan, Chief Executive Officer	張念坤博士 行政總裁
Chair of Institute of Electrical and Electronics Engineers (IEEE) Fellow Committee 2013	2013年國際電機電子工程師學會院士委員會主席
Member, Research Grants Council, Education Bureau of HKSAR	香港特區政府教育局研究資助局委員
Member, Award Scheme Administration Committee, Innovation and Technology Scholarship Award Scheme, HKSAR	香港特區政府創新科技獎學金計劃獎學金管理委員會委員
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, Management Board of the Institute of Network Coding, The Chinese University of Hong Kong	香港中文大學網絡編碼研究所管理委員會委員
Member, Innovation and Technology Advisory Committee and Information and Communications Technology Services Advisory Committee, Hong Kong Trade Development Council	香港貿易發展局創新及科技諮詢委員會、及資訊及通訊技術服務諮詢委員會委員
Member, Research Grants Council Editorial Sub-group, Research Grants Council, Education Bureau of HKSAR	香港特區政府教育局研究資助局編輯小組委員
Director, Hong Kong Branch of the National Engineering Research Centre for Application Specific Integrated Circuit System	國家專用集成電路系統工程技術研究中心香港分中心主任
Member, Management Committee, Hong Kong Branch of the National Engineering Research Centre for Application Specific Integrated Circuit System	國家專用集成電路系統工程技術研究中心香港分中心管理委員會委員

Prof. Peter Yum, Chief Technology Officer	任德盛教授 首席科技總監
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
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
Vice Editor-in-chief, Chinese Journal of Electronics	中國電子學報副主編
Adviser, Hong Kong Federation of Education Workers	香港教育工作者聯會顧問
Member, Technical Committee of Information Technology Standardization, Guangdong Province	中國廣東省信息技術標準化技術委員會委員
Member, Grand Judging Panel, Hong Kong ICT Awards 2013	2013香港資訊及通訊科技獎大獎評審委員會委員

Dr. Chao Shen-chang, Vice President and Group Director	趙盛章博士 副總裁及研發群組總監
Member of Advisory committee, Department of Information Engineering, The Chinese University of Hong Kong	香港中文大學信息工程學系諮詢委員會委員
Member of the Assessment Panel, Small Entrepreneur Research Assistance Programme (SERAP), Innovation and Technology Commission	創新科技署小型企業研究資助計劃評審委員會評審委員
Member of the Industrial Advisory Board of the Department of Electronic and Computer Engineering, The Hong Kong University of Science and Technology	香港科技大學電子和計算機工程學系工業諮詢委員會委員
Honorary Adviser of IT Department at United Christian Hospital	基督教聯合醫院信息技術部榮譽顧問
Co-opted Member of the Admission Panel of Incu-App Technology Incubation Programme of Hong Kong Science and Technology Parks Corporation.	香港科學園網動科技創業培育計畫審批委員會外部評審員

Dr. Justin Chuang, Vice President and Group Director	莊哲義博士 副總裁及研發群組總監
Editorial Board Member, China Communications Magazine, China Institute of Communications (CIC) and the IEEE Communications Society (ComSoc)	中國通訊學會和國際電機電子工程師通訊學會中國通訊雜誌編輯委員
Adjunct Professor, Electronic and Computer Engineering, The Hong Kong University of Science and Technology	香港科技大學電子及計算機工程學系兼任教授

Dr. Wang Keh-chung, Vice-President and Group Director	王克中博士 副總裁及研發群組總監
Member, Technical Programme Review Committee, IEEE, International Microwave Symposium 2012, TA-24 on "Digital Processing Circuits and Systems at GHz Speed"	國際電機電子工程師學會2012年國際微波會議論文評審委員：技術24組「GHz數字處理電路和系統」
Member, IEEE, MTT-9 Technical Coordinating Committee, "Digital Signal Processing" 2012	國際電機電子工程師學會2012年微波理論及技術分會聯絡委員會MTT-9委員
Member, Technical Programme Committee, IEEE International Symposium on Radio-Frequency Integration Technology 2012	國際電機電子工程師學會2012年國際射頻集成技術會議論文評審委員
Reviewer, IEEE MTT Magazine, 2012	2012年國際電機電子工程師學會微波理論及技術雜誌論文評審委員
Co-chair of Industry Forum, International Wireless Symposium 2014	2014國際無線研討會產業論壇聯席主席
Member of Advisory Board, Electronic and Computer Engineering, The Hong Kong University of Science and Technology	香港科技大學電子及計算機工程學系諮詢委員會委員
Deputy Director, Hong Kong Branch of the National Engineering Research Centre for Application Specific Integrated Circuit System	國家專用集成電路系統工程技術研究中心香港分中心副主任
Member, Management Committee, Hong Kong Branch of the National Engineering Research Centre for Application Specific Integrated Circuit System	國家專用集成電路系統工程技術研究中心香港分中心管理委員會委員

Dr. Wu Enboa, Vice President and Group Director | 吳恩柏博士 副總裁及研發群組總監

Board Member, China Solid State Lighting Alliance	中國固態照明聯盟董事會成員
Specialist, Bureau of Information and Technology, Fujian Province	中國福建省信息化局專家
Member, Centre Advisory Committee, The Hong Kong University of Science and Technology R&D Centre, Foshan	中國佛山香港科技大學研發中心 中央咨詢委員會委員
Adviser, Xiamen Optoelectronics Industry Association	廈門市光電子行業協會顧問

Dr. Francis Lee, Vice President and R&D Director | 李致淳博士 副總裁及研發總監

Member of the Potential Employers, BSc (Hons) in Green Energy Science of The Hong Kong Baptist University Accreditation	香港浸會大學綠能科學學士班確認 程序可能僱主團成員
Guest Lecturer, Physics Department, The Hong Kong Baptist University	香港浸會大學物理系客座講師

Mr. David Poon, Vice President, Corporate Communications and Company Secretary | 潘占達先生 副總裁（傳訊）及公司秘書

Member, Management Committee, Hong Kong Branch of the National Engineering Research Centre for Application Specific Integrated Circuit System	國家專用集成電路系統工程技術 研究中心香港分中心管理委員會委員

Dr. James Lei, 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. Tsai Chen-jung, R&D Director | 蔡振榮博士 研發總監

Member, Forum Committee, China International Optoelectronic Expo (CIOE)	中國國際光電高峰論壇專家委員會 委員
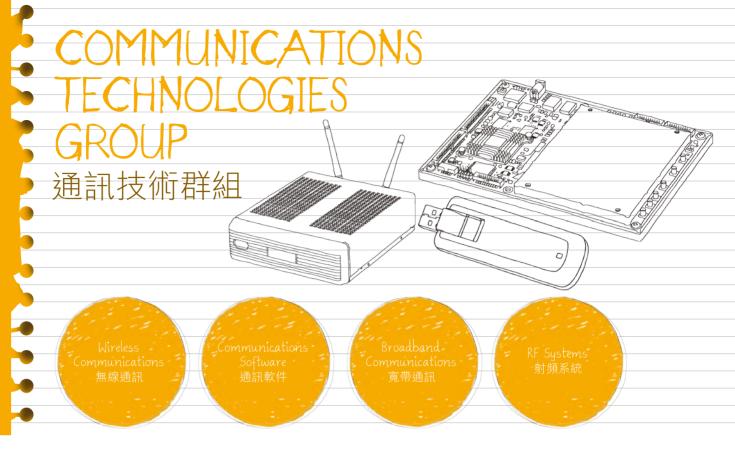
REPORTS OF R&D GROUPS AND TEAMS
研發群組及小組報告

INNOVATIVE SOLUTIONS
BLOSSOMING OPPORTUNITIES
領導潮流 開拓商機

COMMUNICATIONS TECHNOLOGIES GROUP
通訊技術群組

Wireless
Communications
無線通訊

Communications
Software
通訊軟件

Broadband
Communications
寬帶通訊

RF Systems
射頻系統
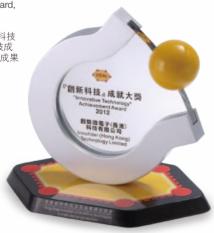
The Communications Technologies (CT) Group has been focusing on developing enabling technologies for advanced communication systems and applications offering high value, market-driven and customer-focused technology solutions. Its core technological competitiveness and expertise comprise three areas: (1) communications software, (2) communications baseband core, and (3) RF systems and transceivers. On top of these, CT has been focusing on mainstream standard-based core technologies, for example 4G/LTE, and has been strengthening its competitiveness through combining core technologies and competencies, from RF systems to higher layer communication software. This is to provide standard or non-standard based high add-on value communication systems and solutions to industry.

通訊技術群組一直致力於為先進的通訊系統與應用開發促成技術,提供高價值、市場導向,及以客戶為中心的技術解決方案。其核心技術競爭力和專長包括三個技術領域:(一)通訊軟件、(二)通訊基帶核心,及(三)射頻系統及收發器。同時,群組一直專注於主流標準化核心技術,例如4G/LTE技術,並通過結合從射頻系統到高層通訊軟件的核心技術與研發能力來增強競爭力,為業界提供標準或標準之外的高附加值通訊系統和解決方案。

ASTRI's LTE partner Innofidei won the FITMI Innovative Technology Achievement Award, recognizing ASTRI's R&D achievements in LTE
合作夥伴創毅贏得香港創新科技及製造業聯合總會「創新科技成就大獎」,應科院的LTE研發成果再次獲得肯定

The 4G LTE Data Card supporting both TD-LTE and LTE FDD standards
4G LTE 數據卡支持 TD-LTE 及 LTE FDD 兩個標準

Commercial LTE Data Card based on ASTRI's LTE technology enhances user experience on wireless radio network access
採用應科院技術的商用LTE數據卡有效提高無線網絡接入的用戶體驗

= **2** number 數目   = **2** million HK$ 百萬港元

Patents Filed 專利申請	17
Patents Granted 獲得專利	19
Agreements Signed 簽訂合約	19
Income Received from Industry* 從業界所得收入 *	21.6

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

Patents Granted 獲得專利

Technological Areas	科技範疇
LTE	LTE
Antenna	天線
Wireless Networks	無線網絡
RF Systems	射頻系統

Patents Filed 專利申請

Technological Areas	科技範疇
TD-LTE	TD-LTE
Antenna	天線
Wireless Communications	無線通訊
RF Systems	射頻系統

The Group made distinguished achievements in innovation and commercialization during the year. On innovation, 19 patents were granted in LTE, antenna, wireless communication and RF systems; while 17 patent applications were filed in TD-LTE, antenna, wireless network and RF systems. Regarding commercialization, income received from industry reached HK$21.6 million, which was over 42 per cent of the total ITF project costs, and the total contract value signed with industry came close to HK$30 million, which included HK$15 million in exclusive licensing fee, demonstrating the high add-on value of the Group's R&D achievements.

群組於本財政年度，在技術的創新及市場化方面取得傑出的成就。在技術創新方面，獲批的專利共十九項，技術範疇包括LTE、天線、無線通訊和射頻系統。群組同時在TD-LTE、天線、無線網絡和射頻系統等方面提交了共十七項專利申請。在市場化方面，群組本年度的業界收入總額達二千一百六十萬港元，相等於創新及科技基金項目總成本的百份之四十二以上。群組與業界簽署的合同總價值三千萬港元，當中包括一千五百萬港元之獨家授權費，充份反映群組開發出的科研成果具相當高的市場價值。

INNOVATIONS
技術突破

As a leader in 4G/LTE technologies, the CT Group delivered the world's first commercial-grade LTE small cell and LTE terminal baseband core reference design, which fully complies with LTE Rel-9 and supports both TDD and FDD modes. The technologies address the demand of high-speed mobile data in the 4G/LTE network. They are field proven, having passed interoperability tests with infrastructure vendors and operators. In particular, ASTRI has successfully passed the TDD and FDD handover testing in the China Mobile Hong Kong network. The commercially-ready technologies enable customers to manufacture commercial wireless communication products in a timely fashion.

The Group developed a high performance multi-core packet processing protocol stack (FastGate) which can be used on commercial off-the-shelf (COTS) hardware platforms to achieve very high (14Mpps) packet processing performance. The technology was licensed to a telecom equipment vendor on the Mainland.

通訊技術群組是4G/LTE技術的領導者，成功研發出全球首枚符合LTE-9標準的，同時支持TDD和FDD模式的商用級LTE小基站和LTE終端基帶核心參考設計。這些技術解決了4G/LTE網絡的高速移動數據需求。群組的技術得到業界的認同，並成功通過設備供應商和運營商的互通性測試。值得一提的是，應科院已經在中國移動香港網絡成功通過了TDD和FDD切換測試。群組成熟及可商品化的技術，使客戶可適時生產商用的無線通訊設備產品。

群組已經研發出一個高性能數據包處理軟件（FastGate），可用於商業現貨供應（COTS）的硬件平台上，以作非常高性能（14Mpps）的數據包處理。該技術已授權予一間中國內地的電訊設備供應商。

End-to-end LTE network with TD-LTE and LTE FDD is based on ASTRI's technologies
包含多項應科院LTE技術的端到端TD-LTE 及 LTE FDD網絡

The Group also successfully developed a low-power 3G/4G cellular UE RF transceiver chip supporting TD-LTE/TD-SCDMA standards with configurable bandwidth from 1.4MHz up to 20MHz. Power consumptions of the receiver and transmitter are 255mW and 275mW respectively, which are ideal for extending battery life. Three patent applications were filed in the areas of bandwidth calibration, DC offset cancellation and low-voltage bandgap reference.

Meanwhile, the RF system team developed digital pre-distortion for Class AB and high-power Doherty power amplifiers to increase power amplifier efficiency, interference cancellation technique for GSM/WCDMA/LTE standards and wide-band LTE base station antennas, with 800MHz bandwidth to cover all TD-SCDMA and LTE bands in Hong Kong and the Mainland.

群組亦成功開發了支持TD-LTE/TD-SCDMA標準的低功耗3G/4G蜂窩終端射頻收發晶片，可配置的帶寬為1.4MHz至20MHz。接收機和發射機功耗分別為255mW和275mW，大大延長了電池壽命。群組已就該項目申請了三項專利，涵蓋寬帶校正、直流電壓偏差消除及低電壓帶隙基準電壓參考等技術領域。

同時，射頻系統團隊已開發數碼預失真的AB類和高效能的多爾蒂功率放大器，以提高功率放大器的效率，並開發出支持GSM/WCDMA/LTE標準以及寬頻LTE基站天線的干擾消除技術，帶寬800MHz，可覆蓋中國內地和香港所有的TD-SCDMA及LTE頻段。

Dr. Eric Tsang, Director
Took part in successfully developing the world's first commercial grade LTE TDD/FDD small cell baseband core technology
曾江州博士，總監
參予全球首個商用級LTE TDD/FDD小基站基帶核心技術的成功研發

LTE Evolved Packet Core
(entry level 3U based platform)
LTE核心網設備
（小容量3U硬件平台）

Cellular 3G/4G RF Transceiver Chip
3G/4G射頻收發器晶片

COMMERCIALIZATION
市場化

Commercial LTE Small Cells based on ASTRI's LTE technology enhance radio spectral efficiency and wireless network coverage
採用應科院技術的商用LTE小基站有效提高無線頻譜資源及無線網絡覆蓋

During the year under review, the Group further developed and commercialized LTE-R9 small cell and terminal baseband reference designs in both TDD and FDD modes in collaboration with its global partners. It has exclusively licensed the embedded DSP and L1 control software of UE baseband technology to Innofidei (Hong Kong) Technology Limited. Innofidei is a chip and system solution provider for mobile handsets focusing on the Mainland market. It has been supporting telecom operators including China Mobile with chips and system solutions encompassing the LTE technology licensed from ASTRI. Innofidei has expressed intention to continue licensing and commercializing CT's technologies, including machine-to-machine (M2M) devices and multi-mode, multi-standard terminal chipsets.

在本財政年度內，通訊技術群組與全球多個合作夥伴共同進一步研發同時支援TDD和FDD模式的LTE-R9小基站和終端基帶參考設計，並予以商業化。群組已獨家授權了終端基帶技術的嵌入式DSP和L1控制軟件予創毅微電子（香港）科技有限公司。創毅是一間專注中國內地市場的手機晶片及系統解決方案供應商，一直利用應科院授權的LTE技術，開發晶片和系統解決方案，支援中國移動等電訊運營商。創毅已經表示希望繼續取得群組的技術授權，包括機器對機器（M2M）通訊技術設備和多模多標準的終端晶片等，將有關之技術進行商業化。

With the Group's LTE small cell baseband core technology, a partner Airspan developed a commercial picocell with wireless backhaul named AirSynergy. The Group also grew its femtocell technologies to small cell technologies, which appeals to a much larger market. In particular, the Group has been developing the next generation LTE small cells based on a mainstream SoC platform, enhancing mobile voice and data services in enterprises and residences in metropolitan as well as rural areas.

The Group continued collaboration with Innofidei on 3G/4G cellular UE RF transceiver development. The project team has started work with a top Mainland chip supplier and smart card expert on developing a general purpose 2.4GHz RF SoC, which includes an RF transceiver, a baseband module, an embedded MCU and an embedded non-volatile memory.

Meanwhile, the Group continued to offer cost-effective and competitive communication software technologies to customers. LTE femtocell gateway technology, including the high performance, multi-core packet processing protocol stack (FastGate), was licensed to a major wireless system manufacturer on the Mainland. The Group's IP backbone network management system was licensed to a major system integrator in Taiwan and deployed in the largest Multiprotocol Label Switching network there.

Targeting at the huge Mainland market, the Group's RF systems team positions itself as a provider of a low-cost and high-performance solution to the Mainland's wireless network product manufacturers. The team successfully transferred digital pre-distortion (DPD) and interference cancellation scheme (ICS) technologies to various wireless communication equipment companies.

Dr. Billy Chan, Principal Engineer
Leading and managing projects related to sensor network gateway and Internet-of-Things platform software technologies
陳少平博士，主任工程師
領導和管理傳感網網關及物聯網
（IoT）平台軟件技術研發項目
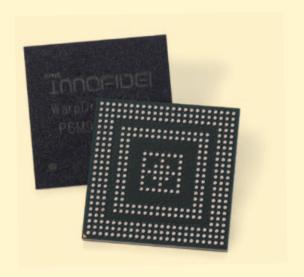
合作夥伴Airspan採用群組的LTE小基站基帶核心技術，開發出商用的無線回程微微蜂窩 AirSynergy。群組也把家用基站技術發展成小基站技術，服務更龐大的市場。其中，群組開發了新一代基於主流系統晶片平台的LTE小基站，增強處於大城市或人口稀少地區的企業和住宅的流動語音及數據服務。

群組繼續與創毅研發3G/4G蜂窩式終端射頻收發器。項目團隊已經開始與一間內地領先的晶片供應商及智能卡專家，共同研發一枚通用的2.4GHz射頻系統晶片，當中包括射頻收發器、基帶模塊、嵌入式微控制器和嵌入式非揮發性記憶體。

通訊技術群組不斷為客戶提供具成本效益及競爭力的通訊軟件技術。群組的LTE 家用基站網關技術，包括其高性能及多核心數據包處理軟件已授權予一間中國內地主要的無線系統製造商。群組的IP骨幹網絡管理系統亦已授權予一間台灣的主要系統集成商，並在台灣最大的多協議標籤交換網絡中部署。

群組的射頻系統團隊針對中國內地龐大的市場，致力為無線網絡產品製造商提供低成本和高性能的解決方案並以此作為定位。該團隊已將數碼預失真技術及干擾消除方案，成功地轉移給多間無線通訊設備公司。

The Commercial LTE Category 4 Terminal SoCs uses ASTRI's LTE technologies
採用應科院LTE技術的商用第四類LTE終端SoC

FUTURE DEVELOPMENT
未來發展

CT Laboratory
通訊技術群組實驗室

The LTE team has started working on technologies deploying LTE small cells in the public network to meet challenges such as interference control between macro cells and small cells in a densely deployed network. With self-configuring and self-optimization capabilities in LTE small cells, network operators can make good use of LTE small cells to reduce both capital and operating expenditures while maximizing network capacity and efficiency.

The communication software team will leverage core technologies in communication gateways to develop a WiFi+4G small cell convergence gateway, supporting seamless access and handover between WiFi and 4G small cell network for traffic offloading, as well as reducing mobility signalling to mobile core networks.

通訊技術群組的LTE團隊已經開始開發在公共網絡部署LTE小基站的技術,以應付種種挑戰,例如怎樣在佈置密集的網絡中控制宏基站和小基站之間的干擾。藉著LTE小基站的自我配置和自我優化等能力,網絡運營商能有效地利用LTE小基站來降低資本和運營開支,同時達到最大的網絡容量和效率。

群組的通訊軟件團隊將利用通訊網關的核心技術開發一個WiFi + 4G小基站融合網關,該網關將支持WiFi和4G小基站網絡之間的無縫切換和流量分流,以減少移動核心網的信令壓力。

Also, the broadband communication team will continue developing cost-effective, dual-mode multi-band RF transceiver chip for TDD/FDD LTE terminal. The transceiver will support major LTE frequency bands around the world. In addition, the team will build a system platform to develop a broadband baseband prototype in field programmable gate array (FPGA). The prototype will support the Mainland's broadband cable access standard HINOC 2.0 and will be backward compatible with HINOC 1.0.

The Group will combine know-how in digital RF and LTE to deliver a low profile active antenna system in collaboration with major operators. This, together with trends in cloud-based processing, offers potentials in achieving "greener" communication infrastructures.

群組的寬頻通訊團隊將繼續開發具有成本效益的，可應用於LTE終端的TDD／FDD雙模多頻射頻收發器晶片。該收發器將支持世界各地的主要LTE頻段。此外，團隊將建立一個系統平台，用以開發寬頻基帶接入系統原型機，該原型機將支持中國內地的有線寬頻接入標準HINOC2.0及與HINOC1.0向下兼容。

通訊技術群組將結合對數碼射頻和LTE專門的知識，與主要運營商合作，提供一個薄型有源天線系統，配合以雲端處理為基礎的發展趨勢，提供實現「綠色」通訊基礎設施開發的潛力。

Digital Repeater Module with DPD/
CFR/ICS for 2G/3G
具備DPD/CFR/ICS 性能的2G/3G
數碼直放站模塊

The Commercial LTE Category 4
Terminal SoCs uses ASTRI's LTE
technologies
採用應科院LTE技術的商用第四類
LTE終端SoC

New generation Commercial LTE
Small Cell supports TD-LTE and
LTE FDD standards
新一代LTE商用小基站支持
TD-LTE和LTE FDD兩個標準

PROJECT HIGHLIGHTS
研發項目

Project 項目	Duration 時期
1 Reconfigurable RF 可重構射頻	Nov 2010 – Oct 2012 二零一零年十一月至二零一二年十月
2 Access Gateway Platform for LTE Access Networks LTE 網絡接入網平台	Jan 2011 – Nov 2012 二零一一年一月至二零一二年十一月
3 Dual-mode TD-LTE/TD-SCDMA RFIC Transceiver TD-LTE/TD-SCDMA雙模射頻收發器晶片	Jun 2010 – Dec 2012 二零一零年六月至二零一二年十二月
4 LTE Release 9 Evolution and Performance Enhancement LTE 第九版本演化及性能增強	Jul 2011 – Jan 2013 二零一一年七月至二零一三年一月
5 LTE Femto Access Subsystem LTE家用基站接入子系統	Jan 2012 – Jun 2013 二零一二年一月至二零一三年六月
6 Cost-effective TDD/FDD LTE RF Transceiver 具成本效益的TDD/FDD LTE射頻收發器	Oct 2012 – Oct 2014 二零一二年十月至二零一四年十月
7 Digital Repeaters 數碼中繼器	Jun 2012 – Dec 2013 二零一二年六月至二零一三年十二月
8 Highly Integrated LTE Small Cell Baseband Core based on Mainstream SoC Device 高整合度LTE 小型基站基帶核心	Mar 2013 – Sep 2014 二零一三年三月至二零一四年九月
9 Advanced Detection of Water Seepage 先進的滲水檢測	Mar – Aug 2012 二零一二年三月至八月
10 Broadband Cable Communications Key Technologies 寬帶電纜通訊關鍵技術	Jul 2012 – Jan 2013 二零一二年七月至二零一三年一月
11 Generic Sensor Gateway for 6LoWPAN Applications 支援6LoWPAN應用之通用傳感網網關	Dec 2012 – May 2013 二零一二年十二月至二零一三年五月

Platform Project
平台項目

Seed Project
種子項目

ENTERPRISE & CONSUMER ELECTRONICS GROUP

企業與消費電子群組

- Digital Home Technology 數碼家庭技術
- Intelligent Surveillance Technology 智能監控技術
- Mobile Multimedia Communications Technology 移動多媒體通訊技術
- Multimedia Technology IP 多媒體技術-知識產權
- Pervasive Service Technology 普及服務技術
- Telehealth Technology 遠程醫療技術

The Enterprise & Consumer Electronics (ECE) Group creates and expands Hong Kong's core intellectual property (IP) by focusing on three main technology areas, namely application software, embedded computing and cloud service computing, for developing enterprise and consumer software and systems.

Within these technology areas, ECE has established core competences that follow industry technology trends, including rising user experience focus, devices becoming smart, personalized and socialized contents and services, sensors everywhere, holistic security and intelligent surveillance. These trends will drive and impact ECE's technology development in the next few years.

Based on core competences established in the main technology areas, ECE over the past few years has acquired relevant domain knowledge and developed four main vertical systems and relevant applications covering education, infotainment, health, and safety.

企業與消費電子群組致力於創造和擴展香港的核心知識產權,將重點放在三個主要技術領域上,包括應用軟件、嵌入式計算和雲服務計算,以開發企業和消費者軟件和系統。

群組在這些技術領域內建立的核心能力,緊貼行業技術發展趨勢,即以使用者體驗為重點、設備智能化、內容和服務的個人化和社交化、無所不在的感應器、整體的安全性,以及智能監控。這些趨勢將推動和影響企業與消費電子群組在未來幾年的技術發展。

基於在主要技術領域內所建立的核心能力,群組過去幾年獲取了相關領域知識,開發了四個主要的垂直系統和相關應用程式,涵蓋了教育、資訊娛樂、健康和安全等範疇。

ALS System won Gold Award, Best Lifestyle (Learning & Living) in Hong Kong ICT Awards 2013
ALS 系統技術獎最佳生活時尚獎及通訊技術獎最佳生活時尚獎(學習·生活)金獎

Learning Management System
電子學習管理平台

Learning Management System (LMS)
電子學習管理平台

A teacher using LMS for preparing lessons at home
老師正利用電子學習管理平台在家中備課

= **2** number 數目　　　= **2** million HK$ 百萬港元

Patents Filed 專利申請		17
Patents Granted 獲得專利		27
Agreements Signed 簽訂合約		23
Income Received from Industry* 從業界所得收入 *		11.7

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

ECE will continue expanding relevant research and development within the scope of each industry's technology trend to maintain its leading position on core competence. The Group will also focus and strengthen commercialization efforts on the four main vertical systems with new applications under the Key Technology Initiative (KTI) programme structure.

企業與消費電子群組將在各行業的技術發展趨勢範圍內持續擴展相關研發活動，以保持其核心能力的領先地位，在重點研發項目的計畫結構下，集中在四個主要垂直系統的新應用上，加強商用化的努力。

Patents Granted 獲得專利

Technological Areas	技術範疇
3D Technology	三維技術
Video Encoding	視頻編碼
Video Decoding	視頻解碼
Video Quality	視頻質素
Multimedia over Internet	通過互聯網的多媒體傳輸
Mobile Device Collaboration	移動設備協作
TV Usability	電視用戶體驗
Voice over IP Security	IP語音安全性
Voice over IP	IP語音
Home Networking	家庭網絡
IC Design	集成電路設計

Patents Filed 專利申請

Technological Areas	技術範疇
3D Technology	三維技術
Mobile Device Collaboration	移動設備協作
Anonymous Single Logon Technology	匿名單一登錄技術
Object Identification from Video	從視頻訊號中的物體識別技術

INNOVATIONS
技術突破

Surveillance Video Analysis

ECE's surveillance video analysis technology enables efficient and effective automatic information extraction from vast amount of surveillance video clips. Moving objects in a video clip can be detected automatically, and information such as colour, movement direction and size is extracted with high accuracy. Such information can be fed into an integrated retrieval system for users to quickly search for a specific object of interest from analysed video clips.

監控視頻分析技術

企業與消費電子群組研發的監控視頻分析技術，能迅速而有效地從大量監控視頻中自動提取有用信息。此技術能從視頻中自動檢測移動目標，亦能提取關於該目標的各種資料，如顏色、移動方向、大小等等。用戶能利用這些資料作搜索，從已分析的視頻中快捷地找出對應目標。

ECE Laboratory
企業與消費電子群組
實驗室

iShare Media Streaming was adopted by i-Cable for live telecasting the 2012 London Olympics on the Internet and mobile networks
iShare 流媒體技術獲有線電視採用，在互聯網和移動網絡上直播 2012 年倫敦奧運

Ms. Yang Hua, Engineer
Took part in developing digital home set-top box technologies which won three industry awards
楊華，工程師
參與開發數碼家庭機頂盒技術，並贏得三項大獎

Learning Management System and Mobile Collaboration e-Learning Platform

ASTRI's learning management system (LMS) can be installed in not only school-based servers but also cloud. Cloud-based LMS allows material sharing and collaboration among schools and students. Many types of learning models such as collaborative learning, mobile learning and personalized learning can be effectively implemented. The LMS access control ensures data will be handled with high security.

In parallel, ASTRI's mobile collaborative e-learning platform (MCLP) supports management of learning activities on e-learning devices, group formation and efficient distribution of contents for sharing. It aims at transforming the education mode from teacher-centric learning to interactive and student-centric learning.

Media Sharing Platform

To overcome the many difficulties and challenges in using the Internet as a means for "broadcasting" video content to the mass audience, the Group developed the iShare P2P platform to enable the use of existing Internet infrastructure and broadly available consumer electronics devices to bring live or stored video content to TV viewers and Internet users at any place and any time. The ultimate test for this technology was conducted during the London Olympics in 2012 when i-Cable adopted this technology for smooth live telecast of the Games on the Internet and mobile networks accessible through PCs, iPhone, iPad and Android phones and tablets.

電子學習管理平台和移動協作教學平台

應科院的電子學習管理平台不但能裝置在以學校為基礎的伺服器內，更可安裝到雲端。基於雲的電子學習管理平台有助學校及學生之間共享教材和協同合作。許多類型的學習模式，例如協作學習、移動學習和個人化學習，也能得到有效地實踐。電子學習管理平台的訪問控制，可確保數據高度安全地處理。

與此同時，應科院研發的移動協作學習平台支援管理利用電子學習設備進行的學習活動、分組活動及快速分發教學資源以作分享。這平台的目的是將以教師為中心的教學模式，轉向互動和以學生為中心的學習模式。

媒體傳輸共享平台

利用互聯網廣播視頻內容存在種種問題，為克服這些挑戰，企業與消費電子群組開發 iShare P2P 平台，利用現存的互聯網架構和消費者電子設備，把即時或者已存儲的視頻內容隨時隨地傳遞到電視觀眾和互聯網用戶。此技術的最終測試在二零一二年倫敦奧運會期間進行，有線電視採用此技術，通過互聯網和無線網絡作奧運網上直播，觀眾可利用桌面電腦、iPhone、iPad 及 Android 手機和平面電腦等流暢地欣賞賽事。

X Screen Technology
多屏技術

X Screen supports game control, providing interactivity among devices
多屏技術支援遊戲控制，讓不同設備之間可以互動

X Screen Technology

X Screen technology is based on Smart CE OS to create an enhanced three-screen application across multiple platforms and devices. This technology supports sharing of videos, audios, pictures and documents. It also supports device controlling and game console with user-friendly interactivity among devices.

多屏技術

多屏技術建基於智能操作系統，在跨平台和設備上作增強的三屏應用。該技術支援視頻、音頻、圖片和文件共享，也可支援遊戲控制器，可以讓不同設備之間作用戶友好的互動。

X Screen video sharing interface on mobile phones
多屏互動手機視頻分享界面

X Screen Voice Control
多屏互動語音輸入

X Screen Game Control
多屏互動遊戲控制

Andriod TVbox
安卓電視盒

ENTERPRISE & CONSUMER ELECTRONICS GROUP
企業與消費電子群組

COMMERCIALIZATION
市場化

The ECE Group has developed a rich portfolio of e-learning technologies, covering e-learning tablet hardware design, learning management system (LMS), mobile collaborative e-learning, classroom learning activity management, and cloud-based e-learning. The technologies have been adopted by one of the biggest service providers in Hong Kong, offering primary schools a most comprehensive solution for both in-class and out-of-class learning. The solution includes a cloud-based LMS, a classroom activity management system and learning applications running on tablets. The interactivity provided by the solution has significantly aroused student interest in learning.

The document digital rights management system for e-learning project provides a secure and scalable document digital rights management (DRM) system and cross-platform DRM-enabled e-reader software to help the publishing industry deliver e-books or e-learning materials to the education market and grasp the emerging market opportunities. A few local publishers licensed the technology after participating in its trial.

The intelligent cloud security computation for big data application project aims at developing new intelligent transactional data processing technologies such as complex event processing and streaming database. It also distributed security computation platforms to support scalable, error resilient and efficient anomaly detection and statistics tracking. The platform is important for tackling the challenges of security and performance for a range of big data applications. The ECE Group signed agreements with customers to apply the technologies in communication network processing and financial transaction analysis.

Smart CE OS related technologies were applied to several TCL products through a licence agreement during the year under review. The client's applications MULTISCREEN and iCEScreen on iOS platform were launched in the Apple Store market successfully. In addition, KoolSee, a local company, engaged in licensing and contract service with ASTRI. The corresponding technologies were applied to several products sold on the Mainland, including OTT Android TV dongle/mini box, media player, Android STB and Android PC.

企業與消費電子群組已經開發出豐富的電子學習技術組合，涵蓋電子學習平板電腦的硬件設計、電子學習管理平台、移動協作學習、課堂學習活動管理和基於雲端計算的電子學習。這些技術被香港最大的服務供應商採用，為各小學提供最全面的解決方案，用於課堂及課外學習，其中包括一個基於雲計算的電子學習管理平台，一個課堂活動管理系統，以及多項在平板電腦上運行的學習應用程式。解決方案所提供的互動性已大大激發起學生的學習興趣。

應用於電子學習的文件數碼版權管理系統項目提供一個安全和可拓展的文件數碼版權管理系統，及跨平台和具有數碼版權管理功能的電子閱讀軟件，有助出版業交付電子書籍和電子學習材料給教育市場，並把握正在興起的市場機會。一些本地出版商參加了該應用技術的試用後已簽約取得相關授權。

大數據的智能雲安全計算平台項目以開發智能事務性數據處理的新技術（例如複雜事件處理和流數據庫）和分佈的安全計算平台為目標，以支持可擴展、容錯、有效率的異常檢測和統計追蹤。對於應付關於各種大數據應用的安全和性能的挑戰而言，這是一個重要的平台。企業與消費電子群組已經與多家客戶簽約，把技術應用在通訊網絡處理和金融交易分析上。

智能消費電子產品操作系統的相關技術，已透過一項授權協議應用於TCL幾款產品中。iOS平台上的MULTISCREEN和iCEScreen客戶端應用程式成功在蘋果商店推出。此外，一家本地公司KoolSee與應科院簽訂授權協議和研究合約，把相關的技術應用到在中國內地市場銷售的一些產品，包括基於Android的電視棒／盒、媒體播放器、Android機頂盒和Android電腦等。

Andriod Dongle
安卓電視棒

Andriod Minibox
安卓迷你電視盒

FUTURE DEVELOPMENT
未來發展

The ECE Group's development in intelligent surveillance technology will focus on algorithms used in automatic surveillance video analysis applications with particular effort on improving the accuracy and speed of different analysis algorithms and distribution systems for analysing large amount of video.

For mobile e-learning, the focus is on creating a rich portfolio of e-learning technologies, covering areas of e-learning tablet hardware design, Learning Management System, mobile collaborative e-learning, classroom learning activity management, and cloud-based e-learning. It is the new paradigm of learning that the classroom can exist anywhere. Moving forward, a framework will be offered to develop e-learning tools for a virtual classroom, including e-learning applications and textbooks on augmented reality, to facilitate participation in classroom activities anywhere and anytime.

Network, media and security are rapidly becoming intertwined with technology, especially regarding the Internet. Major trends driving change include changes in technology, changing patterns in how people use technology and the Internet, and universal trust and identity issues. In the decade ahead, the focus may shift back to technology centric security, driven by significant increases in data volume, processing speed, communication technology, and emergence of more complex and automated threats. ECE will focus on developing common core technologies related to network, media and security to support cloud-based vertical systems and applications.

企業與消費電子群組在智能監控技術方面的研發，將專注於利用自動監控視頻分析應用的算法，致力改善分析算法的準確性和速度，以及用於大量視頻分析的分佈系統。

在移動電子學習技術方面，群組將繼續著力開發一系列的電子學習技術，涵蓋的範圍包括電子學習平板電腦的硬件設計、電子學習管理平台、移動協作學習、課堂學習活動的管理，及基於雲端計算的電子學習等。無處不在的教室是新的學習模式，應科院正準備推出一個框架，用以開發虛擬教室內需要的學習工具，包括加入擴增實境（Augmented Reality）的應用程式和電子課本，讓師生隨時隨地參與教室學習活動。

網絡、媒體與安全愈來愈快速地與科技交織在一起，特別是互聯網。促成這改變的主要趨勢包括技術的變革、人們使用科技和互聯網的模式的改變，以及普遍的信任和身份問題。在未來十年，重點可能會重回到以技術為中心的安全性，被更大量的數據、更快的處理速度、更先進的通訊技術，以及更複雜的和自動化的威脅所驅動。企業與消費電子群組會將重點放在發展與網絡、媒體和安全有關的共同核心技術，以支援各種基於雲的垂直系統和應用程式。

Dr. Kent Wu, Senior Engineer
Chief architect and key developer of iShare MP2P streaming platform which contributed to smooth live telecast of 2008 Beijing Olympics and 2012 London Olympics
吳康恆博士，高級工程師
iShare 可管理點對點（P2P）流媒體直播系統的總設計師及開發者，該系統促成 2008 年北京奧運和 2012 年倫敦奧運網上直播的順利進行

Big Data Monitoring Platform enables in-depth, visualized observation and analysis of big data applications such as P2P video streaming, network management and data transactions
利用大數據監控平台可對一些大數據應用進行深入、可視化觀察及分析，例如 P2P 視頻流、網絡管理和數據交易

The Group's future R&D efforts on smart digital home-embedded computing technology will emphasize on Android-based embedded software and system technologies for smart digital home applications, such as multi-screen/cross screen, home/personal cloud and hybrid cloud applications.

Telehealth research will focus on utilizing information and communications technologies to improve healthcare services delivered by community nurses. It is intended to be expanded to address other healthcare applications beyond the hospital environment, including elderly healthcare and personal wellness management.

群組未來在智能數碼家庭－嵌入式計算技術的研發，重點將落在為智能數碼家庭應用而開發的基於Android的嵌入式軟件和系統技術上，例如多屏互動，三屏融合，家庭/人雲和混合雲的應用。

企業與消費電子群組在遠程醫療方面的研發將專注於利用資訊及通訊科技改善由社康護士所提供的醫療保健服務，並計劃擴展至醫院以外的醫療保健應用，包括老年醫療保健和個人健康管理。

Trial use of Telehealth System by hospital nurses
醫院護士試用遠程保健系統

Telehealth Hub in Tablet Form Factor
遠程保健中心的平板電腦

Voice input through X Screen for content searching and sharing
透過多屏技術輸入語音以便搜索和分享內容

PROJECT HIGHLIGHTS
研發項目
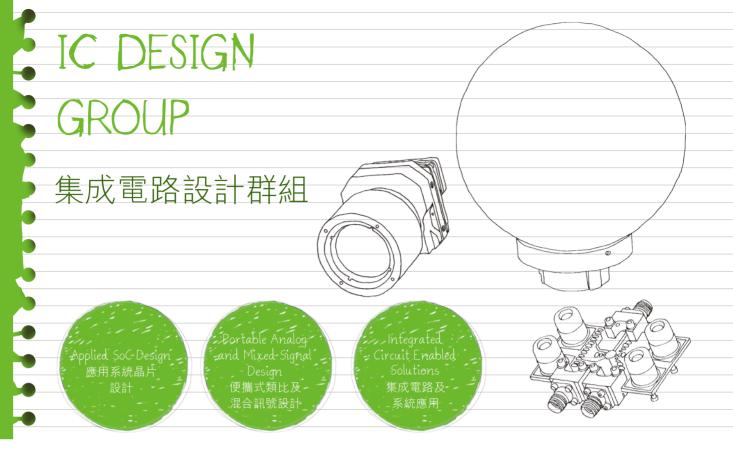
		Project 項目	Duration 時期
1	P	Intelligent Surveillance Video Scene Analysis 智能監控視頻分析	Mar 2013 – May 2014 二零一三年三月至二零一四年五月
2	P	Intelligent Mobile Surveillance Technology Platform 智能移動監控技術平台	Dec 2010 – Jun 2012 二零一零年十二月至二零一二年六月
3	P	Mobile Collaborative e-Learning Platform 移動協作學習平台	Dec 2011 – Jun 2013 二零一一年十二月至二零一三年六月
4	P	Cloud Facilitated e-Learning 雲端輔助之電子學習平台	Nov 2012 – Nov 2014 二零一二年十一月至二零一四年十一月
5	P	Ultimate e-Book for e-Learning 用作電子學習的終極電子書	Jul 2010 – Jun 2012 二零一零年七月至二零一二年六月
6	P	Document Digital Rights Management System for e-Learning 可應用於電子學習的文件數碼版權管理系統	Dec 2011 – Aug 2013 二零一一年十二月至二零一三年八月
7	P	Android Digital Home Technology Platform Android數碼家庭技術平台	Aug 2010 – Aug 2012 二零一零年八月至二零一二年八月
8	P	Smart Consumer Electronics Operating System Framework – Android Plus 智能消費電子產品操作系統框架 — Android+	Oct 2012 – Apr 2014 二零一二年十月至二零一四年四月
9	P	Telehealth Technology Platform 遠程健康照護技術平台	Dec 2011 – Sep 2013 二零一一年十二月至二零一三年九月
10	P	High-efficiency Video Post-processing Silicon IP for Digital TV 高性能數碼電視視頻後處理晶片	Sep 2010 – Sep 2012 二零一零年九月至二零一二年九月
11	P	65 nm Multimedia Full HD SoC Development Platform 65納米多媒體全高清SoC開發移動學習平台	Jul 2010 – Jul 2012 二零一零年七月至二零一二年七月
12	P	Visual Signal Processing Technology for Emerging 3D Applications 面向新興三維視頻應用的視像訊號處理技術	Jul 2010 – Jun 2012 二零一零年七月至二零一二年六月
13	S	Digital Asset Management 數碼資產管理	Aug 2011 – Feb 2013 二零一一年八月至二零一三年二月
14	S	Privacy Protection Technology for Connected Devices in Cloud Environment 針對網絡設備在雲端運算環境中隱私保護技術	Oct 2012 – Apr 2013 二零一二年十月至二零一三年四月
15	I	Clustering-based Surveillance Video Summary and Object Retrieval System 基於分類的監控視頻濃縮和目標檢索系統	Feb 2012 – Apr 2013 二零一二年二月至二零一三年四月
16	I	Collaborative e-Learning for e-Schoolbag Pilot 電子書包先導計劃內的協作學習	Mar 2012 – Jun 2013 二零一二年三月至二零一三年六月

P	Platform Project 平台項目
S	Seed Project 種子項目
I	ICP 業界合作項目

IC DESIGN GROUP

集成電路設計群組

Applied SoC Design
應用系統晶片
設計

Portable Analog
and Mixed-Signal
Design
便攜式類比及
混合訊號設計

Integrated
Circuit Enabled
Solutions
集成電路及
系統應用

The first Hong Kong Branch
of the National Engineering
Research Centre for Application
Specific Integrated Circuit
System was set up
香港第一所國家專用集成電路
系統工程技術研究中心分中心
已成立

The past year was marked with success and excitement for the IC Design (ICD) Group.

First of all, the Group's consummate competence in IC design was exemplified by the establishment of the Hong Kong Branch of the National Engineering Research Centre for Application Specific Integrated Circuit System, approved by the Ministry of Science and Technology. The Branch is collaborating closely with the National ASIC Engineering Centre at Southeast University in Nanjing. This marks an important milestone in ASTRI's pursuit of advancing innovation and technology development in Hong Kong.

More accomplishments followed throughout the fiscal year starting with the USB3.0 SSD controller SoC and the AC-DC power conversion platform for LED lighting in May. They were followed by the successful testing of the first 10G CMOS optical communication transceiver ICs in July, the LCD TV display enhancement controller in August, the radio frequency power amplifier and the pico-projector LED driver projects in November and December respectively, and finally the 25G optical communication ICs in February 2013.

集成電路設計群組在過去一年取得多項成就，令人深感滿意和興奮。

首先，群組憑著超卓的集成電路設計能力，獲國家科學技術部批准，成立「國家專用集成電路系統工程技術研究中心香港分中心」，與位於南京東南大學的主中心合作。分中心的成立是應科院提升本港創新及科技發展的又一里程碑。

集成電路設計群組全年取得的多項技術成就包括：在五月完成了USB3.0 固態盤控制器晶片和適用於LED照明的AC-DC電源轉換平台；在七月成功測試了第一枚10G CMOS光通訊收發器晶片；同年八月，液晶電視的顯示增強控制器亦宣告完成；在十一月和十二月，射頻功率放大器以及微型投影機內的LED驅動器晶片項目相繼完成；在二零一三年二月又完成了25G光纖通訊集成電路，圓滿地結束了這一年 。

Home Use Brain Computer Interface
家用式腦機界面系統

The Home Use Brain Computer Interface System supports
a range of new applications such as e-learning, health
monitoring, gaming and entertainment
家用式腦機界面系統支持一系列新應用，包括電子學習、
健康監控、遊戲和娛樂

= 2 number 數目　　　**= 2** million HK$ 百萬港元

Patents Filed 專利申請		22
Patents Granted 獲得專利		19
Agreements Signed 簽訂合約		24
Income Received from Industry* 從業界所得收入 *		14.6

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

There are three key technology initiatives (KTIs) under the ICD Group, including Applied SoC Design (ASD), Portable Analog and Mixed Signal Design (PAD), and Integrated Circuit Enabled Solutions (ICES).

The Group filed 22 patent applications and was granted 19 new patents during the period. On commercialization, ICD signed 24 technology transfer agreements with industry and received HK$14.6 million from industry.

集成電路設計群組的三個重點研發領域分別是：應用系統晶片設計、便攜式類比及混合訊號設計，以及集成電路及系統應用。

群組在年內提交專利申請二十二項，獲得專利十九項。在商品化方面，群組與業界共簽訂二十四份技術轉移合約，從業界所得收入達一千四百六十萬港元。

Patents Granted 獲得專利

Technological Areas	技術範疇
Phase Lock System	相位鎖定系統
Pico-projector	微型投影機
Java	Java
LED Lighting	LED 照明
Optical Sensor	光學感測器
Home Appliance	家電
ESD Protection	防靜電保護
Data Converter	數據轉換器
Power Management	電源管理

Patents Filed 專利申請

Technological Areas	技術範疇
Optical Sensor	光學感測器
LED Lighting	LED 照明
Data Converter	數據轉換器
ESD Protection	防靜電保護
Super Resolution	圖像超解析度
Solid State Memory Control	固態記憶體控制
Direct Digital Synthesizer	直接數碼式頻率合成器
Near Field Communication	近場無線通訊

INNOVATIONS
技術突破

Applied SoC Design (ASD)

The ASD team completed two platform and two seed projects, as well as a number of contract services during the year. Working closely with customers on designing, implementing and verifying products in several key areas including healthcare, signal processing and secure solid state storage, ASD contributed in creating for people a smart and quality lifestyle.

ASD's image processing technologies offer the most natural and realistic 3D visual sensation by instantly converting 2D contents into stunning 3D scenery. The team's research on holographic scenery synthesis has shown very promising results. In addition, it developed state-of-the-art super resolution techniques to enhance resolution of video content. Besides applications in TVs and projectors, these technologies can also be customized for portable electronics such as smartphones, tablets and ultrabooks, etc.

應用系統晶片設計

應用系統晶片設計組在年內完成了兩個平台項目、兩個種子項目和數個合約研究項目。團隊一直在設計、實施和測試上與用戶緊密合作。主要研發領域覆蓋醫療、訊號處理和安全數據存儲幾方面，為市民大眾帶來智能優質生活努力作出貢獻。

團隊開發的圖像處理技術，能夠將二維內容實時轉換為三維影像，為用家提供最自然逼真的三維視覺享受。團隊在研發全息顯示技術上也取得理想成果。此外，團隊開發了先進的超解像技術，能美化互聯網電視節目的低解像度內容。以上技術不僅可應用於電視和投影機，也可定制化來配合便攜式電子產品，如智能手機、平板及超薄型電腦等。
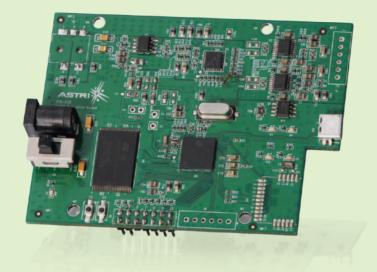
Researching and developing 2D to 3D Conversion Technology
二維至三維轉換技術的研發

Evaluation board of the Medical
Acoustic Processing Platform
應用於醫療聲音處理的評估板

在訊號處理方面，團隊的新研發方向是把音頻處理研究成果應用於醫療設備如電子聽診器上，令聽診器既可配備先進的降噪技術，而成本不會大幅增加。

團隊成功開發存儲技術，製造出傳輸速率極快、可靠及安全性高的存儲方案，可使用在手提電腦、個人電腦及數據伺服器的固態硬盤。團隊的存儲技術都配備了USB3.0或PCI-e 接口，適合個人或企業使用，又配備了硬件加密引擎，以防止他人未經授權存取用戶的數據。

便攜式類比及混合訊號設計

As a new initiative in signal processing, the team's research on audio processing enables healthcare devices such as electronic stethoscope to be equipped with advanced noise reduction technologies at minimal additional cost.

便攜式類比及混合訊號設計組在過去一年完成了一個業界合作項目和三個平台項目，取得重大進展。除了致力發展核心模擬技術，團隊積極擴展知識產權組合，以配合新的消費電子產品和工業應用。

**Ms. Karen Wan,
Principal Engineer**
First inventor of four U.S. patents
and co-inventor of six U.S. patents
温皓明，主任工程師
四項美國專利的第一發明者及
六項美國專利的共同發明者

ASD's success in storage technology development contributes greatly to the development of fast data-rate, reliable and secure thumb drives, portable hard drives and solid-state-disk drives used in ultrabooks, personal computers and data servers. ASD's storage solutions can be equipped with USB3.0 or PCI-e interface to suit the needs of consumer or enterprise applications. They also include hardware encryption engines to protect user data against unauthorized access.

例如團隊為微型投影技術開拓了革命性的新應用，包括平視顯示（Head Up Display）和頭戴式顯示（Head Mounted Display）。團隊開發出一款具有成本優勢的矽基液晶LCoS成像晶片，為廠商提供了一個高效能、低功耗及具成本效益的解決方案，進一步推動微型投影機市場的成功發展。

Portable Analog and Mixed Signal Design (PAD)

The PAD team made significant progress in technology development with the completion of one Industry Collaborative Project (ICP) and three platform projects. While continuing research on core analog technologies, PAD expanded its IP portfolios to support new consumer electronics and industrial applications.

For example, many revolutionary applications have been developed for pico-projectors including head-up display (HUD) and head-mounted display (HMD). PAD also developed a cost-effective LCoS imager IC, offering a high-performance, low-power and cost-effective solution to manufacturers and further enhancing the successful deployment of pico-projectors in the market.

Night vision applications have been greatly enhanced by using infrared sensor read-out IC (ROIC) for uncooled bolometers. PAD is developing a ROIC platform, using micro-bolometers for high resolution uncooled infrared cameras and imaging equipment. Such devices are useful in navigational aid for cars at night, as well as in industrial and marine applications.

Integrated Circuit Enabled Solutions (ICES)

ICES successfully developed 10G and 25G optical communication transceiver ICs in 2012. The product family includes transimpedance amplifiers (TIA), limiting amplifiers (LA) and laser drivers. The 10G solution was implemented in 65nm CMOS process while the 25G solution was realized in 0.13μm SiGe BiCMOS process.

團隊研發的紅外線傳感器讀出集成電路（ROIC），用於非製冷測輻射熱計，大大地促進了夜視領域的應用。團隊現正努力開發一個高解像度微測輻射熱計的ROIC平台，供非冷卻紅外線照相機和成像設備應用。這些器件的用途非常廣泛，包括支援汽車夜間導航、工業及海事應用。

集成電路及系統應用

集成電路及系統應用組在2012年內成功開發了10G和25G光纖通訊收發晶片。該系列產品包括轉阻放大器（TIA）、限幅放大器（LA）和激光驅動器。10G晶片採用高成本效益的65納米CMOS工藝，而25G晶片則使用高速度的0.13微米SiGe BiCMOS工藝為解決方案。

Evaluation boards for
10Gb/s and 25Gb/s Transceiver ICs
10Gb/s 與 25Gb/s
收發器集成電路評估板

Infrared Camera
Module for Thermal
Imaging
紅外熱成像攝像頭

Reports of R&D
Groups and Teams
研發群組及小組報告

Dr. Jiao Yuzhong,
Senior Engineer
Author of several research papers
published in the International
Conference of IEEE Engineering in
Medicine and Biology Society
(IEEE EMBC)
焦玉中博士，高級工程師
曾在 IEEE EMBC 國際會議發表
研究論文

IC DESIGN GROUP
集成電路設計群組

COMMERCIALIZATION
市場化

Applied SoC Design (ASD)

In early 2013, ASD signed an ICP agreement with a reputable company on the Mainland focusing on the design and sale of storage controllers. The project will deliver a novel method to strengthen data security storage in the cloud.

Meanwhile, 2D to 3D real-time video conversion platform technologies were licensed to a U.S. partner and embedded into its flagship 3D converter products currently available in U.S. and European markets. The product empowered by ASTRI technologies can produce high quality 3D images at low cost. The technologies also enabled the partner to further expand market reach in digital signage and medical applications.

Upon completion of two contract research projects, a new agreement was signed with one of the world's top fabless IC design houses to develop communication ICs. The front-end and back-end design teams have been working closely with the customer to hone skills and deliver the best quality service.

Portable Analog and Mixed Signal Design (PAD)

Commercial production of PAD's solution of AC-DC conversion by a leading Hong Kong company is in full swing. Solid state lighting technology was licensed to local IC vendors for mass production, production volume reached over 100,000 units per month.

應用系統晶片設計
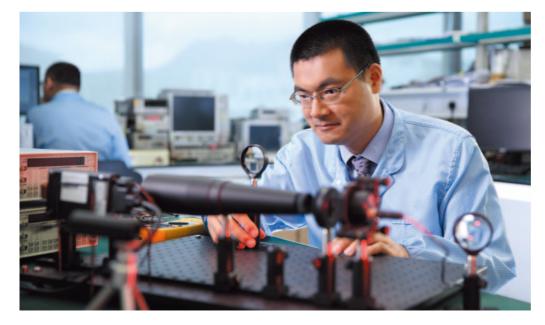
在二零一三年年初，團隊與一家專營存儲控制器設計和銷售的內地公司簽署了一個「業界合作項目」，該項目的目標是提供一種可以加強雲數據存儲安全的新方法。

二維至三維實時視頻轉換技術，已授權予一家美國公司，在他們的旗艦產品三維轉換器內使用。該轉換器現已在美國及歐洲市場發售，利用應科院技術，可以低成本提供高質素三維視像。今次技術授權也有助客戶開拓數碼標牌和醫療應用的市場。

另外，團隊成功與一家國際領先的IC設計公司合作，並先後完成了兩個合約研究項目，其後又簽署了一個新合約，合作研發商業用的集成電路產品。前端和後端設計團隊與該設計公司保持緊密合作，在提升團隊的研發能力的同時，提供最優質的服務。

便攜式類比及混合訊號設計

一家領先的香港公司已將團隊開發的交流／直流轉換器解決方案進行大規模量產。固態照明技術已授權給幾家本地集成電路公司使用，每月生產量超過十萬台。

The Holographic Display, which reconstructs true 3D light field of a virtual scene, is the next generation of highly immersive 3D display solution
全息顯示器能夠重現虛擬場景的真實三維光場，是未來高真實感的三維顯示解決方案

LED BB Lamps
LED 斑馬線燈

BB lamps equipped with ASTRI's power-saving LED driver
are installed outside University MTR Station
配備應科院低功耗LED驅動器的斑馬線燈，已安裝於大學
港鐵站外

Analog-to-digital converter technologies secured several licensing and contract service agreements. Analogue front-end (AFE) technologies were licensed to several design houses for applications in consumer, computing and communication products.

An IC product incorporating PAD's 3-channel G-sensor IP went into production shortly after the technology was licensed to a leading provider of SoC design and services. More than four million units of the product were shipped to customers in the first six months of production.

In the pico-projector area, PAD completed the design of one of the best picture quality LCoS imagers in the industry. The design is the first of its kind in Hong Kong and the Mainland. PAD also signed a licensing agreement and a contract research agreement with a leading LCoS supplier.

Targeting the needs of the emerging body sensor network (BSN) market, PAD is partnering with the Hamlyn Centre, Imperial College London, one of the world's leading research centres in BSN technologies, to develop a new ultra low-power BSN sensing platform for the Elite Sport Performance Research in Training (ESPRIT) Programme in London.

團隊開發的模擬數碼轉換器技術已簽訂幾份技術授權合約及合約研究項目。模擬前端技術已授權予幾家設計公司，應用於消費、電腦和通訊產品。

此外，團隊開發的三通道G-傳感器IP，已授權予一間系統晶片設計及服務領先供應商。客戶獲授權後不久，利用該技術設計一款晶片並量產。在量產的首六個月，付運數量已超過四百萬。

微型投影機方面，團隊設計了一款在業內被視為顯示效果最佳的矽基液晶成像晶片，其設計在香港和中國內地均屬於首創。團隊已就該技術與一家領先的矽基液晶供應商簽訂了技術授權合約和合約研究項目。

為了滿足新興的傳感器網絡（BSN）市場的需求，團隊與倫敦帝國學院哈姆林中心合作為英國「訓練精英運動員表現研究計畫」（ESPRIT）開發新型超低功率的BSN傳感平台。倫敦帝國學院哈姆林中心是BSN技術方面的全球領先研究中心之一。

LED BB lamp equipped with
ASTRI's LED Driver
配備應科院LED驅動器的斑馬
線燈

IC DESIGN GROUP
集成電路設計群組

FUTURE DEVELOPMENT
未來發展

Applied SoC Design (ASD)

Based on the team's expertise and successes in commercializing image signal processing and storage technologies, ASD will continue expanding its business scope and application areas.

In image signal processing, ASD will continue enhancing super resolution and stereoscopic imaging to keep pace with future generations of digital displays in home entertainment and portable consumer electronics. Based on initial success in audio processing research, the team is working hard to explore applications in the healthcare industry.

In the storage area, ASD will aim at delivering novel and environmentally-friendly SSD-based solutions to meet increasing demands for highly reliable and ultra-fast data storage for consumer, enterprise and data-centred applications.

With the explosion of Internet-of-Things, the team is dedicated to exploring and delivering niche technologies to address the huge market of "smart" electronics, such as smartphones and smart appliances to contribute significantly to lifestyle betterment.

Portable Analog and Mixed Signal Design (PAD)

PAD continues to support customers in meeting design challenges. One example is the brain computer interface (BCI) which has significant potential in education, entertainment and healthcare sectors. This project involves precision analog-front-end design, mixed signal integration and low-noise measurement. PAD will continue efforts in providing portable and cost-effective solutions for brain signal pattern reorganization.

Radio frequency identification (RFID) and near-field communication (NFC) are emerging technologies expected to have great impact on logistics operations, mobile payments and consumer electronics. PAD will use its expertise in low-power analog design to develop innovative solutions.

Brain Computer Interface
System evaluation board
腦機界面系統評估板

PAD is collaborating with Imperial College London to develop wireless body sensor network (WBSN). The partnership will design WBSN solutions for patient monitoring and medical parametric tracking through the Internet. WBSN is an important technology to realize telehealth and has the potential to become part of our daily life.

應用系統晶片設計

憑藉在訊號處理和存儲技術方面的專長，以及成功商品化的堅實基礎，團隊繼續擴充業務範圍和開拓新應用。

在訊號處理方面，團隊將重點發展超解像度技術及立體圖像處理技術，緊貼在家庭娛樂和便攜式消費電子產品使用的新一代數碼顯示屏的發展趨勢。隨著音頻處理研究取得的初步成功，團隊將繼續努力，為醫療保健行業開發更多新應用。

在存儲技術方面，團隊將發展新興及環保的固態硬盤解決方案，以滿足企業和雲端存儲服務供應商對可靠性高和超高速數據存儲日益增長的需求。

隨著物聯網的快速發展，團隊致力於探索和提供利基技術，以滿足市場對智能電子產品的需求，如智能手機和智能家電等，繼續為提升生活質素作出更大的貢獻而努力。

便攜式類比及混合訊號設計

團隊繼續開拓不同領域的新技術，支持業界面對設計上的挑戰。如腦機接口研發在教育、娛樂及醫療保健方面的應用正快速發展，應用要求高精度模擬前端和數碼後端的混合訊號集成及低噪聲測量技術。團隊將研發用於腦電波模式識別，具成本效益的可攜帶式解決方案。

射頻識別與近場通訊等新興技術，對物流管理、移動付款和消費電子將帶來極大影響。團隊將利用其在低功耗模擬設計的專長，開發創新的解決方案。

在無線人體傳感器網絡方面，團隊正與倫敦帝國學院合作，開發通過互聯網進行病人監測和醫療參數追蹤的無線人體傳感器網絡解決方案。人體傳感器網絡有助實現遠程醫療，也有可能成為我們日常生活的一部分。

Brain Computer Interface
腦機界面

An engineer performing an electroencephalography (EEG) experiment to develop Brain Computer Interface System for home use
工程師正進行腦電圖實驗，以開發家用式的
腦機界面系統

DDR4 is the upcoming dynamic random-access memories (DRAMs) interface standard for applications in servers, networking, storage, graphic and personal computing. PAD will develop a double data rate 4 (DDR4) physical layer device (PHY) which can be used in a wide variety of system-on-chip (SoC) solutions as the interface to external high-speed memories.

PAD is continuing research in direct digital synthesis to develop a group of high-speed analog and digital IPs to facilitate frequency synthesis for applications in wireless communication, radar and antenna arrays, etc.

Integrated Circuit Enabled Solutions (ICES)

Having successfully developed 10G and 25G optical communication transceiver ICs in 2012, the team is developing 25G clock and data recovery units, which are critical components in optical transceiver modules. Their main function is the reconditioning of signals before and after transmission over fibre optic cables.

In addition to the efforts of the aforesaid three key technology initiatives, the ICD Group will initiate collaborative projects between ASTRI and Nanjing's Southeast University as part of the plan of the Hong Kong Branch of the National Engineering Research Centre for Application Specific Integrated Circuit System.

DDR4是新一代動態隨機存儲體接口標準，將廣泛應用於伺服器、網絡、存儲、圖形處理及個人電腦領域。團隊將開發DDR4的物理層接口（PHY），可用於各種需要與外部高速存儲器接口的SoC解決方案。

此外，團隊繼續研究直接數碼頻率合成技術。該項目將開發一組用於數碼頻率合成的高速模擬和數碼知識產權，可用於無線通訊、雷達和天線陣列等領域。

集成電路及系統應用

承接在二零一二年成功研發出10G和25G光通訊收發器晶片，團隊在二零一三年將研發25G時鐘和數據恢復電路，這些都是光纖通訊收發模塊中的關鍵組件，其主要功能是在光纖電纜傳輸前後修復訊號。

集成電路設計群組除了致力發展上述三個重點研發領域相關技術，並將會啟動數個應科院與東南大學的聯合研發項目，作為國家專用集成電路系統工程技術研究中心香港分中心計劃的一部分。

IC DESIGN GROUP
集成電路設計群組

PROJECT HIGHLIGHTS
研發項目

	Project 項目	Duration 時期
	Applied SoC Design 應用系統晶片設計	
1 **I**	Secure Mobile Storage Processor 移動存儲安全處理器	Mar 2013 – Jun 2014 二零一三年三月至二零一四年六月
2 **P**	LCD TV Display Enhancement Controller 液晶電視顯示增強控制器	Jun 2010 – Aug 2012 二零一零年六月至二零一二年八月
3 **P**	SSD Controller SoC with Super-speed USB3.0 USB3.0固態硬盤控制器晶片	Nov 2010 – May 2012 二零一零年十一月至二零一二年五月
4 **P**	Hardware Accelerated Super-resolution Technology 硬件加速超解像技術	Jul 2012 – Apr 2014 二零一二年七月至二零一四年四月
5 **P**	Stereoscopic Image Signal Processor 立體圖像信號處理器	Mar 2012 – Oct 2013 二零一二年三月至二零一三年十月
6 **S**	Medical Acoustic Processing Platform 應用於醫療的聲音處理平台	May – Nov 2012 二零一二年五月至十一月
7 **S**	Enterprise PCIe-based Storage Acceleration Platform 用於企業的PCIe 存儲加速平台	May – Nov 2012 二零一二年五月至十一月
8 **S**	3D Holographic Stereogram 三維全息立體圖	May – Nov 2012 二零一二年五月至十一月
9 **S**	Architecture Evaluation of Android-based High-performance Multi-core CPU 安卓系統多核高性能處理器之架構評估	Nov 2012 – May 2013 二零一二年十一月至二零一三年五月
	Portable Analog and Mixed Signal Design 便攜式類比及混合訊號設計	
10 **I**	Radio Frequency Power Amplifiers using Gallium Arsenide Hetero-junction Bipolar Transistors 使用砷化鎵異質結雙極型電晶體管研發的射頻功率放大器	May 2010 – Nov 2012 二零一零年五月至二零一二年十一月
11 **P**	Advanced AC-DC Power Conversion Platform for LED Solid State Lighting 先進的交流轉直流LED照明方案	Nov 2010 – May 2012 二零一零年十一月至二零一二年五月
12 **P**	AMS IP Platform for MEMS Sensor 應用在微機電系統傳感器的混合訊號集成電路的知識產權 平台	Jun 2011 – May 2013 二零一一年六月至二零一三年五月
13 **P**	Integrated LED Driver for Pico-projectors 微型投影機LED混合訊號驅動集成電路	Jun 2011 – Dec 2012 二零一一年六月至二零一二年十二月

	Project 項目	Duration 時期
14	AFE and Mixed Signal IPs for Integrated RFID NFC Controllers Design AFE和混合信號IP集成無線射頻辨識系統近場通訊控制器設計	May – Nov 2012 二零一二年五月至十一月
15	Brain Computer Interface System and ICs 腦機界面系統及晶片	Jul 2012 – Jan 2013 二零一二年七月至二零一三年一月
16	Feasibility Study of DDR4 Analog PHY Architectural Design with Industry Standard DFI Bus Interface 一個具備行業標準DFI界面的DDR4模擬PHY建築設計的可行性研究	Feb – Aug 2013 二零一三年二月至八月
17	High-speed and Agile Direct Digital Synthesizer 高速和敏捷的直接數碼頻率合成器	Oct 2012 – Oct 2014 二零一二年十月至二零一四年十月
Integrated Circuit Enabled Solutions 集成電路及系統應用		
18	10G and 25G Optical Communication ICs 10G/25G光纖通訊適用的高速集成電路	Nov 2010 – March 2013 二零一零年十一月至二零一三年三月

MATERIAL & PACKAGING TECHNOLOGIES GROUP

材料與構裝技術群組

**Packaging and Sensing
構裝與感測**

- Compact Camera
  微型相機
- Healthcare Electronics
  醫療保健電子

- Advanced Packaging Technologies
  先進構裝技術
- Display Systems
  顯示系統

**Green Technology
環保技術**

- LED Lighting
  LED 照明
- Energy Harvesting and Storage
  能源採集與儲存

Established in 2005, the Material & Packaging Technologies (MPT) Group has built a solid foundation with a team specializing in developing high-valued, customer-focused products comprising devices, components and module integration that are differentiated mainly by material and packaging technologies. To better meet changing market demands, the Group's development focus gradually evolved to cover primarily packaging and sensing and green technology.

The Group continued to excel with its market-driven application technologies and product-oriented patent portfolios. During the year, the Group filed 37 patent applications and was granted 64 patents from U.S., the Mainland and Taiwan. These patented technologies were licensed 51 times to companies not only in Hong Kong and the Mainland, but also in India and Jordan. On commercialization, 45 contracts were signed with 40 companies, bringing in more than HK$18 million from industry. Moreover, the Group received four technology awards during the year, gaining recognition from the industry.

材料與構裝技術群組自二零零五年成立至今建立了穩固的基礎。群組擁有一群技術專才，致力研發高附加值、以客戶為主導的產品，包括器件、元件、模組和系統，都是以群組精湛的材料和構裝技術來開發，別具創意。為了更迎合市場需要，群組開發科技的重點亦逐漸演變，當下主要研發範圍包括構裝與感測和環保技術。

群組在發展市場所需的應用技術及產品的專利組合方面繼續取得卓越成就。群組在本年度共申請了三十七項專利，從美國、中國內地及台灣獲得的發明專利共有六十四項。這些專利技術已經五十一次授權予香港、內地及遠至印度和約旦的公司，令企業受惠。在產業化方面，群組與四十家公司簽署了四十五份技術轉移合約，從業界獲取收入超過一千八百萬港元。此外，群組在年內共獲得四個技術獎項，足以證明群組研發的技術獲業界認同。

MPT received a couple of awards this year, gaining recognition with its innovation and R&D capabilities
群組今年獲得多個獎項，創意和研發能力得到肯定

High Capacity Anode Materials for Litium-ion Battery (LIB)
鋰電池用新型錫基負極材料

The next generation tin-based anode material for lithium-ion batteries is expected to significantly increase the capacity of future LIBs, which will be an ideal solution for power demanding electronics such as smartphones
預期新一代鋰電池用新型錫基負極材料，可大幅提升未來鋰電池的電容量，特別適合如智能手機等高耗能電子產品應用

= **5** number 數目　　= **2** million HK$ 百萬港元

Patents Filed 專利申請		**37**
Patents Granted 獲得專利		**64**
Agreements Signed 簽訂合約		**45**
Income Received from Industry* 從業界所得收入 *		**18.9**

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

Patents Filed 專利申請

Technological Areas	技術範疇
3D Packaging`	三維構裝
Compact Camera Module	微型相機模組
Concentrating Photovoltaics	聚光太陽能模組
Healthcare Electronics	醫療保健電子
LED Chip & Packaging	LED 晶片與構裝
LED Device & VLED	LED 裝置及垂直型 LED
Li-ion Battery	鋰離子電池
Optical Touch Panel	光學觸控面板
Pico-projector Platform	微型投影顯示平台
Printed Electronics	印刷電子
RFID	射頻識別

Patents Granted 獲得專利

Technological Areas	技術範疇
3D Packaging	三維構裝
Compact Camera Module	微型相機模組
Display Driving	顯示器驅動
Display Method & Apparatus	顯示方法及設備
LED Chip & Packaging	LED 晶片與構裝
LED Device & VLED	LED 裝置及垂直型 LED
LED Luminaries	LED 照明
Lighting Control	照明控制
Optical Sensors	光學感測器
Optical Touch Panel	光學觸控面板
Optics Design	光學設計
Pico-projector Platform	微型投影顯示平台
Printed Electronics	印刷電子
System-in-Package (SiP)	系統級構裝
Tyre Pressure Monitoring System	胎壓監控系統
Wind Generator	風力發電

INNOVATIONS
技術突破

Packaging and Sensing – Compact Camera

Based on the successful compact camera modules, the next generation compact optical zoom module, realized by patent-protected actuation system, was built nearly half the size than those in the market. The module is equipped with an eight-million pixel image sensor, which is three times the optical zoom function. Six patent applications were filed in U.S. for this technology with one already granted.

Packaging and Sensing – Healthcare Electronics

The Group's smart reflective pulse oximetry solution enables measurement of blood oxygen content, heart rate and breathing rate anytime anywhere. This handy device, together with its continual monitoring function, allows overnight sleeping quality analysis to be carried out at home, which is a convenient and simple way for detecting sleep disorder. This device was awarded the "Most Appealing Product" at the Hong Kong International Medical Devices and Supplies Fair 2013. Two patent applications were filed in U.S. for this technology.

構裝與感測 – 微型相機

延續過往開發微型相機模組的佳績，群組利用鏡頭傳動器相關專利技術開發的新一代微型光學變焦模組，比市場現有的體積小接近一半。模組具備了三倍光學變焦功能和八百萬像素解析度。群組就有關技術申請了六項美國專利，其中一項已獲授證。

構裝與感測 – 醫療保健電子

材料與構裝技術群組的智能反射脈搏血氧測量方案，可隨時隨地用作監測血含氧量、脈搏及呼吸率。這輕便的裝置還具備持續監控功能，可用於家中進行睡眠質素分析，有助檢測可能出現的睡眠障礙症，方法既簡單又方便。這款醫療保健電子產品在二零一三年第四屆香港貿發局香港國際醫療器材及用品展榮獲「最受買家歡迎產品」獎項。群組就有關技術申請了兩項美國專利。

ASTRI's e-Classroom project, supported by the Education Bureau, attracted more than 20 schools to the pilot scheme
獲香港教育局支持的應科院「電子教室」項目，吸引至少20間本地學校參與試驗計劃

Dr. Cheng Kwok Sing, Senior Manager
Contributed to a US$2 million business deal with a newly-established Hong Kong company on the exclusive licensing of a compact camera module patent portfolio
鄭國星博士，高級經理
促成一份總值二百萬美元合約的簽署，將微型相機模專利組合獨家授權予一家新成立的本地公司

Packaging and Sensing – Advanced Packaging Technologies

A simulation and optimization software for modelling and simulating the electro-chemical deposition (ECD) of the Cu via filling process was developed to shorten the time-to-market of 3D-IC-based electronic products, as well as to reduce their development cost. The software can be employed as an off-line modelling and simulation tool for manufacturers to determine optimal process window, and for material suppliers to develop ECD materials. The software can also be integrated with via filling equipment by equipment vendors for on-line process monitoring.

Packaging and Sensing – Display Systems

Leveraging its optical multi-touch technologies, MPT, in promoting e-learning in schools, developed the e-classroom solution comprising an interactive whiteboard (E-board) for teachers and an interactive platform (E-desk), equipped with 3D near-field gesture capabilities, for students. Other instant features such as ad hoc voting, quiz, question submissions, etc., are also available to facilitate teacher and student interaction in class. Teaching effectiveness and student interest in learning are also enhanced. Five patent applications were filed in U.S. for this technology.

During the fiscal year, the intelligent audience analysis technology was enhanced with integration of a content selection function into digital signage. A personalized advertising system was developed for instant display of personalized contents to targeted audience. The technology was showcased at a number of exhibitions in Hong Kong and the Mainland. In particular, it was featured in the "Future Reading Experience Zone" at the 2012 Hong Kong Book Fair, attracting numerous visitors and media coverage. A number of patents were filed on technologies relating to intelligent digital signage, including 41 and 37 patents filed in U.S. and the Mainland respectively, and 17 and 26 of them have been granted.

構裝與感測 – 先進構裝技術

為了縮短基於三維集成電路的電子產品進入市場週期並減少開發成本，材料與構裝技術群組開發了一套模擬優化軟體，用來模擬微孔填充工藝的電化學沉積過程。此軟件可作為離線模擬工具來幫助三維集成電路製造商確定其優化工藝視窗，及幫助材料供應商開發新型電化學沉積材料。此軟件亦可整合到設備供應商的微孔填充設備中，成為一個即時的工藝監測器。

構裝與感測 – 顯示系統

群組利用已開發的光學多點觸控技術，又成功開發了「電子教室」。電子教室是一套為推動電子學習而設的解決方案，包括供老師使用的「互動電子白板」，以及可支援近距離三維手勢識別操作，供學生使用的「互動電子課桌」。該方案提供了一個平台，支援即時的線上測驗、投票及提問等功能，大大提升了老師和學生在課堂上的互動，也同時提高了授課的成效和學生對學習的興趣。群組就有關技術申請了五項美國專利。

過去一年，智能觀眾識別系統技術獲進一步改良，內容選擇功能已整合到個人化數碼廣告系統，可針對個別觀眾並即時顯示個人化的內容。這技術曾經在香港和內地不同的展覽場所示範。在二零一二年香港書展中的「未來閱讀體驗區」，該系統便曾經吸引眾多參觀者和多間媒體採訪報導。智能數碼標牌相關技術共申請了四十一項美國專利及三十七項中國內地專利，其中十七項美國專利及二十六項中國內地專利已獲授證。

**Intelligent Audience Analysis
智能觀眾識別系統**

Intelligent Audience Analysis provides real-time face detection and tracking functions. By integrating content selection function into digital signage, a personalized advertising system is developed for instant display of personalized contents to targeted audience

智能觀眾識別系統提供即時人臉追蹤檢測功能，其內容選擇功能已整合到個人化數碼廣告系統，可針對個別觀眾並即時顯示個人化的內容

Prototypes of the all-new short throw and interactive projection devices were developed. These innovative infotainment devices aim at providing users with rich and animated experience. They were first showcased at the International ICT Expo fascinating visitors who tried it out. A total of 13 patent applications were filed in U.S. and the Mainland for these technologies and five of them have been granted.

Green Technology – LED Lighting

The MPT Group has developed a platform to provide a low-cost and accuracy enhanced solution for indoor location tracking function. This simple-to-install system uses readily available LED lamps to identify locations and provide accurate position information which is ideal for applications in safety, security, logistics management and retail sectors. This technology won a Silver Award (Adoption-SMEs) in the Best Green ICT category of the 2012 Hong Kong ICT Awards, as well as a Certificate of Merit in the Hong Kong RFID Awards 2012. One U.S. patent has been granted for this technology.

群組開發了全新的超短焦和交互式投影的工程樣本。這些創新的資訊娛樂設備可為使用者帶來豐富及動畫感的體驗。這些技術首次在國際資訊科技博覽展示時，為參觀者帶來無限驚喜。相關的微型投影技術已申請了十三項美國專利及中國內地專利，其中五項已獲授證。

環保技術 – LED 照明

材料與構裝技術群組研發了一套低成本及精準的室內定位系統。此系統安裝簡易，只需於LED節能燈具加入定位功能便能提供精確的位置定位。其應用範圍廣泛，包括維護安全、大廈保安、物流管理及零售業等。這技術在二零一二年贏得「香港資訊及通訊科技獎」的「最佳綠色科技獎」（應用 - 中小企）銀獎及二零一二年香港無線射頻識別大獎優異獎。群組憑該技術獲得一項美國專利。

Concentration Photovoltaic/
Thermal (CPV/T) Module can
convert more than two-third of
solar energy into both electricity
and hot water for green building
applications
聚光光伏／光熱模組可將三份二
或以上的光能轉換為綠色建築使
用的電能和熱水供應

Optical guider
導光捧

Visible Light Communication
Module with no false alarm,
no RF interference is a precise
solution for indoor location
tracking using LED
可見光通訊模組是高準確度、無
RF干擾的LED室內定位模組

Applying the Group's established "birdcage" technology to facilitate heat dissipation capability, an intelligent omnidirectional LED bulb, with light intensity distribution identical to an incandescent light bulb, was developed to replace CFL lamps (or equivalent 60W incandescent bulb) at a lower cost. A total of 13 patent applications were filed in U.S. and the Mainland with nine of them already granted.

利用獨有的「鳥籠」散熱技術功能，群組研發出智能全方位LED發光燈泡，具有與白熾燈一致的光強分佈，可以低成本地替代節能燈或相等於60W的白熾燈泡。群組已就這技術申請了十三項美國專利及中國內地專利，其中九項已獲授證。

Green Technology – Energy Harvesting and Storage

環保技術 – 能源採集與儲存

Utilizing the high capacity composite anode material developed from previous projects, the Group now focuses on developing the next generation tin-based anode material for lithium-ion batteries. Compatible with existing graphite-based battery manufacturing process, this new anode material is an important component for increasing storage capacity of future lithium-ion batteries. Three patent applications were filed in U.S., the Mainland and Taiwan for this technology.

利用前期項目開發的高容量複合負極材料，群組鑽研開發新一代鋰電池用的新型錫基負極材料。新型錫基負極材料與現有基於石墨的電池製造過程兼容，預期將成為提升未來鋰電池電容量的重要成分。群組就有關技術在美國、中國內地及台灣申請了三項專利。

Based on the concentrating photovoltaic (CPV) module and by leveraging waste heat of solar cells, the Group's concentrating photovoltaic/thermal (CPV/T) module can convert more than two-third of solar energy into electricity and hot water for green building applications. This CPV/T module solution is commercially ready with unsurpassed cost performance ratio for solar farms and roof top applications. The CPV module won the GigaWatt Gold Award at the Solar Industry and Photovoltaic Exhibition and Conference 2012 in Shanghai. Seven patent applications were filed in U.S. and the Mainland.

基於高倍聚光光伏技術，通過利用太陽能電池產生的廢熱，群組的聚光光伏／光熱聯產模組可以將三份之二或以上的太陽能轉換為環保建築使用的電能和熱水供應。此光伏／光熱聯產模組性價比無出其右，適合太陽能電站和屋頂太陽能應用，並已為量產準備就緒。聚光式光伏模組在二零一二年第六屆國際太陽能產業及光伏工程(上海)展覽會暨論壇中贏得「十大亮點」吉瓦級金獎的榮譽。群組就有關技術在美國和中國內地申請了七項專利。

COMMERCIALIZATION
市場化

Packaging and Sensing – Compact Camera

The compact camera module with anti-shaking and auto-focus functions has been successfully commercialized, mass produced and made available in the global market when it was adopted by a mainstream smartphone launched in March 2013. Sales reached multi-millions in the first month with higher forecasts anticipated. The phone also received many favourable reviews from the industry and market.

Packaging and Sensing – Healthcare Electronics

The Group's wireless reflective pulse oximeter was licensed to five companies in Hong Kong and the Mainland and three of them are actively preparing to mass-produce the product with MPT's module embedded.

Packaging and Sensing – Advanced Packaging Technologies

The novel 3D-IC software was licensed to a material supplier of via filling on the Mainland, which was simulated and optimized for material development and integration into via filling equipment for process monitoring. The software was also licensed to one via filling manufacturer in Hong Kong for optimal process window determination, which greatly enhanced manufacturing process.

Packaging and Sensing – Display Systems

Technologies relating to optical multi-touch, intelligent audience analysis and pico-projection were licensed to more than 10 enterprises in Hong Kong, the Mainland, India and Jordan through technology transfers and contract services for commercialization.

During the year, contracts were signed with five companies to license the e-classroom solution. Not only did the technology help industry partners develop a time-to-market solution at very low cost, this innovative design and total solution also effectively facilitated adoption of e-Learning in the community.

Based on its short throw projection light module technology, a contract was signed with a U.S. enterprise to develop a customized module. New applications were also developed targeting at cars and display related industries.

構裝與感測 – 微型相機

具備防抖動（又稱「光學防抖動系統」）及自動對焦功能的微型相機模組已成功產業化、大量生產及在全球市面出售。有關技術已被應用於一款新推出的主流智能手機上，並於二零一三年三月推出市場，手機銷量在推出後的第一個月已達數百萬部，預測銷量會持續上升。這款手機同時亦得到各方面非常高的評價。

構裝與感測 – 醫療保健電子

材料與構裝技術群組的無線反射式脈搏血氧測量技術已授權予五間香港和內地的企業，當中三間已積極準備量產，相關模組亦會整合至新產品中。

構裝與感測 – 先進構裝技術

中國內地一家電化學沉積材料供應商，同時也是微孔填充設備供應商，已採用了群組的模擬優化軟件來開發新型材料。客戶同時亦將此軟件整合到微孔填充設備中，作為即時工藝監測器。此軟件亦已授權予香港一家三維積體電路製造商，用作確定優化工藝視窗。

構裝與感測 – 顯示系統

群組與香港、中國內地、印度及約旦等超過十間企業簽訂技術授權合約及合約研究項目，藉此將相關光學觸控、微型投影及智能觀眾識別技術轉移給企業以進行產業化。

過去一年，單是電子教室方案的技術已授權予五間企業。 這套技術除了令合作夥伴受益於成本非常低的市場解決方案，其創新的設計和全面的解決方案有助推廣電子學習。

群組基於已開發的超短焦距高亮度投影技術，與一間美國企業簽訂合約，為客戶開發一客制化超短焦距高亮度投影模組，以開展在車載及顯示相關工業的新應用。

Ms. Juanna Yao, Manager
Advisor of IP strategic planning and patent commercialization
姚小粧，經理
就知識產權戰略規劃和專利產業化提供建議

Green Technology – LED Lighting

The Group signed technology agreements with eight companies in Hong Kong and the Mainland. MPT's intelligent wireless motion sensing module for LED control system was installed for trial run in an NGO centre under the Hong Kong Housing Society to promote the system's energy-saving capability and intelligence to the community. The system was also installed in two offices in Hong Kong and a cafe in Shenzhen Nanshan Science and Technology Park to further enhance energy-saving capability of their LED lighting systems. Furthermore, the award-winning hybrid mode real-time locating system using LED, an extended technology derived from this project, was licensed to a local enterprise for commercialization.

Green Technology – Energy Harvesting and Storage

The Group's new anode materials for lithium-ion batteries have been developed with high battery capacity, good conductivity and low environmental impact. With such important characteristics in commercial applications, the technology was transferred to three customers, with more companies expressing interest in these new materials.

環保技術 – LED 照明

群組分別與八間本地及內地公司簽訂了技術授權合約。這「無線移動感應模組」現正於多個地點進行測試及試用，包括香港房屋協會旗下一個中心、兩家本地公司及一間位於深圳南山科技園的咖啡室，藉以提高他們的LED照明系統的節能能力。來自本項目的延伸技術混合式LED實時定位系統，已授權予一間本地企業以進行產業化。

環保技術 – 能源採集與儲存

群組研發出用於鋰電池的新型負極材料，兼具高容量，良好的導電性及低環境污染的特性。這些特性對於商業化電池應用是很重要的。該技術已成功轉移給三個客戶，另有其他公司表示對這新材料感興趣。

Researcher measuring the flux and light spectrum of bulbs with the Integrating Sphere
研究員正利用積分球量度燈泡的光通量及光譜

FUTURE DEVELOPMENT
未來發展

The MPT Group will continue focusing on developing packaging and sensing as well as green technology.

材料與構裝技術群組將繼續致力研發構裝與感測和環保方面的新技術。

Packaging and Sensing

The Group's research on compact camera module will continue focusing on technologies relating to lens actuation. Set to be a pioneer in the industry, the Group is developing a compact DSC-class camera equipped with three key optical functions including auto-focus, optical image stabilization and optical zoom.

In healthcare electronics, the Group's new development is a wearable cardiovascular monitoring device for simultaneous measurement of four health parameters, including blood oxygen saturation, heart rate, arterial stiffness and continual blood pressure, with a revolutionary non-invasive cuffless technology.

構裝與感測

在微型相機模組方面,群組會繼續專注於開發鏡頭傳動器的相關技術。群組致力成為業界的先鋒,現正研發具備自動對焦、光學防抖和光學變焦的微型相機。

醫療保健電子方面,群組的最新研發是利用革命性的非侵入性無袖帶技術的穿戴式心血管監測儀,可同時監測四個健康參數,包括血氧飽和度、脈搏、血管硬化指數及連續血壓測量。

SpO2: 98%

Pulse Rate: 61 BPM

Review   Stop

Reflective Pulse Oximeter
反射式脈搏血氧測量儀

Reflective Pulse Oximetry Solution monitors sleeping quality, a convenient way to perform sleeping apnea risk assessment at home
反射式脈搏血氧測量技術能測量個人睡眠質素,方便於家中進行睡眠窒息症風險測試

Intelligent Omnidirectional
LED Bulb for 100W incandescent
replacement
智能全方位100W白熾燈替代型
LED發光燈泡

Green Technology

In green technology, MPT will overcome technical challenges and further develop replacement omnidirectional bulbs with higher power and higher dissipation power to ensure high energy-saving efficiency.

For energy storage, the Group will develop lithium rich cathode as counterpart for high-energy density LIB to provide sufficient lithium ion for anode charging.

先進構裝技術方面，利用模擬優化軟件，可大大縮短三維微互連製造的開發週期並降低製造成本。此軟件的另一個應用是幫助群組開發自有的電化學沉積材料。它可作為一個快速篩選器以挑選合適的電化學沉積候選材料，從而大大縮短材料開發週期。群組開發的電化學沉積材料將會應用到微凸點（間距在二十微米或以下）和高密度互連基板中微孔（表面鍍層厚度少於五微米並沒有凹坑）的製作。

顯示系統方面，群組將進一步開發智能微型投影技術，並探索各種適用於消費電子產業的創新應用，包括在醫療上的應用。研發重點涵蓋移動互動投影、互動及智能穿戴式資訊顯示、頭戴式顯示、智能三維機器視覺及三維全息投影。

環保技術

環保技術方面，群組致力克服LED照明的技術挑戰，將進一步研發可確保節能效率高的高功率與高散熱效能的全方位LED替代燈泡。
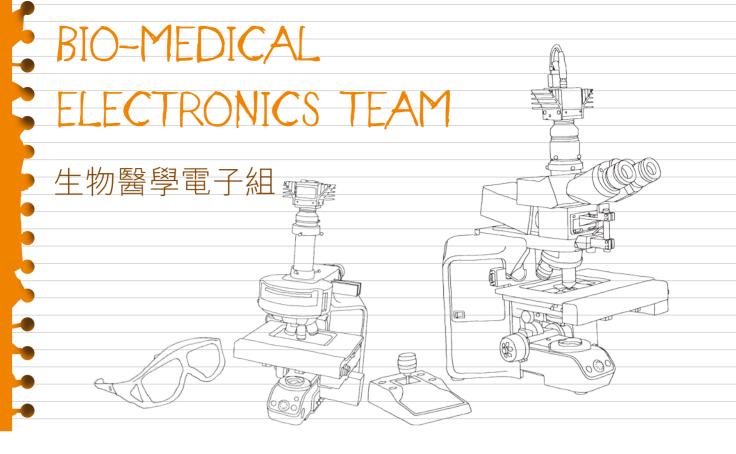
能源儲存方面，群組計劃為高能量密度鋰離子電池，研發相對的富鋰負極材料，以提供足夠鋰離子作高電容陽極充電。

In advanced packaging technologies, by applying the simulation and optimization software, the total development cycle time and manufacturing cost for 3D-interconnect fabrication will be greatly reduced. Another application of the software involves the development of the Group's ECD materials. The software can be used as a fast screener to select proper ECD material candidates to significantly reduce the material development cycle time. Such ECD materials can be applied to ECD process for microbump (pitch as 20μm or less) and microvia in high-density-interconnect (HDI) substrate (with surface thickness less than 5μm and no dimple).

With display systems, the Group will further focus on intelligent pico-projection and explore different novel applications for consumer electronics and industries, including the medical field. Major focus areas will include mobile interactive projections, interactive and intelligent wearable information display, head-mounted display, smart 3D machine vision and holographic 3D projection.

PROJECT HIGHLIGHTS
研發項目

Project 項目	Duration 時期
1 (P) Integrated Concentrating Photovoltaic (CPV) Module 聚光式光伏電池模組 (CPV 模組)	Nov 2010 – Nov 2012 二零一零年十一月至二零一二年十一月
2 (P) 3D Wafer-level Packaging (3D-WLP) Technologies for Low-cost CMOS Image Sensor (CIS) 用於低成本CMOS圖像感測器的三維晶圓級構裝技術	Dec 2010 – Nov 2012 二零一零年十二月至二零一二年十一月
3 (P) Intelligent Display-Personalized Advertising Display System 智能顯示器 - 個人化智能廣告顯示系統	Mar 2011 – Aug 2012 二零一一年三月至二零一二年八月
4 (P) Intelligent Lighting Sensor Module 智能燈光感應模組	Nov 2011 – Apr 2013 二零一一年十一月至二零一三年四月
5 (P) Panel Level LED Packaging Platform Development (PL-LED) 面板級 LED 技術平台開發	Dec 2011 – Jun 2013 二零一一年十二月至二零一三年六月
6 (P) Compact Optical Zoom Module 微型光學變焦相機模組	Dec 2011 – Sep 2013 二零一一年十二月至二零一三年九月
7 (P) 3D Pico-projector and Mobile Interactive I/O Devices 三維微投影系統與便攜式互動I/O終端	Jan 2012 – Jan 2014 二零一二年一月至二零一四年一月
8 (P) Development of Anti-counterfeit Identification Microsystem (AIM) by SiP Technology 利用系統級構裝技術開發防偽認證微系統	Apr 2012 – Oct 2013 二零一二年四月至二零一三年十月
9 (P) Interactive Displays for e-Classroom e教室之互動顯示	Oct 2012 – Apr 2014 二零一二年十月至二零一四年四月
10 (P) Cardio-vascular Monitoring Devices for Telecare System 用於遠程照顧的心血管監察儀	Dec 2012 – Jun 2014 二零一二年十二月至二零一四年六月
11 (P) High Capacity Anode in Embedded LIB for Popular Consumer Electronics 消費性電子產品使用嵌入式鋰離子電池之高電容陽極	Jan 2013 – Feb 2014 二零一三年一月至二零一四年二月
12 (P) Mechanism-based Software for 3D-interconnect Fabrication 應用於三維互連製造的機理性軟件	Jan 2013 – Mar 2014 二零一三年一月至二零一四年三月
13 (P) Intelligent Omnidirectional LED Bulb 智能全方位出光型LED球泡燈	Mar 2013 – Feb 2014 二零一三年三月至二零一四年二月
14 (S) Mechanism-based Software for 3D-IC Applications 應用於三維集成電路的機理性軟件	Dec 2011 – Jun 2012 二零一一年十二月至二零一二年六月
15 (S) Optical System for Health Assessment 用作健康評估的光學系統	Oct 2012 – Apr 2013 二零一二年十月至二零一三年四月
16 (S) 3D Power Electronics Modules 三維電力電子模塊	Nov 2012 – May 2013 二零一二年十一月至二零一三年五月
17 (S) New Electro-deposition Materials for 3D-interconnect of High-density Substrate 應用於高密度基板中三維互連的新型電沉積材料	Mar – Aug 2013 二零一三年三月至八月
18 (S) Feasibility Study of Smart Compact 3D Machine Vision System 智能微型三維機器視覺系統的可行性分析	Mar – Sep 2013 二零一三年三月至九月
19 (S) Hybrid Mode Real-time Locating System Using LED 利用LED的混合模式實時定位系統	Mar – Sep 2013 二零一三年三月至九月

(P) Platform Project
平台項目

(S) Seed Project
種子項目

BIO-MEDICAL ELECTRONICS TEAM

生物醫學電子組

In the past year, the Bio-Medical Electronics (BME) Team accumulated experience in user scenarios and established technical credentials in the biomedical industry. The Team continued its R&D efforts with emphasis on human factors, evaluations in clinical environment and medical regulatory support. It also established a programme management structure and strengthened connections with the local medical device industry, non-government organizations, hospitals and medical schools in the territory.

The BME Team was granted a U.S. patent on binocular vision treatment. Together with a U.S. patent granted last year on amblyopia treatment, the brain vision training device project generated substantial IPs which are being used to create various commercialization models.

過去一年，生物醫學電子組從用戶角度開拓新科技已累積了經驗，在生物醫學行業也獲得了肯定。小組的研發工作繼續以人為本，著重臨床環境評估，以及支持醫療監管。小組已建立了一個項目管理架構，加強與本地醫療儀器行業、非政府組織、醫院和大學醫學院之聯系。

小組已獲得雙目視覺處理的美國專利。連同另一項於去年獲得的弱視治療美國專利，整個弱視治療腦訓練設備項目已具備實質的知識產權，小組會積極利用這些專利技術來創造各種形式的產業化。

High Throughput Computer-aided Pathology Diagnosis System
高通量電腦輔助病理診斷系統

High-speed Digital Pathology System
高速數碼病理系統

High-speed and high-quality digitalization of pathology slides enables case sharing and consultations among pathologists
高速和高質素的數碼病理切片讓病理醫生之間可方便地進行遠程會診

A platform project on high-speed digital pathology has gone on well meeting the satisfaction of the major industry partner. A large-scale pathology slide scanning trial was conducted in a local hospital and subsequent analyses and evaluations on the findings would follow.

With input from physicians of a local hospital, an immersive distraction goggle was developed and tested in a local hospital. Initial feedback from physicians was very positive. The new application also attracted wide media coverage.

BME expanded research capabilities to micro-electro-mechanical system (MEMS) for medical and healthcare and a contract research project in MEMS application has been successfully completed.

Traditional Chinese medicine (TCM) presents new opportunity for the Team, especially when they have been able to team up with a local authority in this field – the School of Chinese Medicine of the University of Hong Kong. Guided by their expertise in TCM, and subsequently through collaborations with other TCM authorities in Hong Kong and the Mainland, BME will facilitate the use of commercial-ready science and technologies in systemized and instrumentation-ready TCM.

高速數碼病理系統平台項目進度良好，主要的業界合作夥伴對進展感到十分滿意。一項大規模的病理切片掃描測試已於本地一家醫院進行，小組隨後會作分析及評估。

根據本地一家醫院醫生的建議，小組開發了一種沉浸式分散注意力目鏡並進行測試。醫生對該研發項目的初步試驗結果反應非常正面，此嶄新應用亦引起媒體的廣泛報導。

小組擴大研發範圍至微機電元件在醫療及保健方面的應用，並已成功完成了一項合約研究項目。

中國傳統醫藥為生物醫學電子組提供了新機遇，研發團隊已夥拍本地醫學界權威香港大學中醫學院。透過港大的專業中醫指導，以及隨後與其他香港和內地中醫機構合作的經驗，小組將促進中醫科技的系統化和開發新儀器。

= **1** number 數目　　= **1** million HK$ 百萬港元

Patent Granted 獲得專利

Patent Granted
獲得專利

Technological Area 科技範疇

Binocular Vision Diagnosis and Treatment
雙目視覺診斷和治療的系統和方法

Agreement Signed#
簽訂合約

Income Received from Industry*
從業界所得收入

1.2

\# Joint project with Material & Packaging Technologies Group
與材料與構裝技術群組合作項目

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

Immersive Distraction Goggle System
沉浸式分散注意力目鏡系統

INNOVATIONS
技術突破

Brain Vision Training Device

The occurrence rate of amblyopia (lazy eye) is 3 to 5 per cent worldwide. On the Mainland, there are more than 30 million adults and over 15 million children with amblyopia. The BME Team has developed an effective amblyopia treatment system for patients to use at home or anywhere distant from medical facilities.

The treatment is based on a perceptual template model aimed at providing visual stimuli with patient-specific settings to assist patients in setting up the defective neuro-pathway in their visual cortex. ASTRI's vision training algorithm was granted a U.S. patent.

弱視治療腦訓練系統

弱視在全球的發生率為百分之三至五，單在中國內地已有超過三千萬成人患者，以及超過一千五百萬弱視兒童。生物醫學電子組開發了一套有效的弱視治療腦訓練系統，此系統可用於家中或任何地方。

此弱視訓練程式是基於知覺範本模型，根據圖像的對比度和空間頻率的變化，程式會自動計算患者個別的臨界空間頻率，以作為訓練的重要參數。此弱視治療軟件的算法已獲得美國發明專利。

Immersive Distraction Goggle
沉浸式分散注意力目鏡

Patients watching videos with the eye goggle while undergoing medical treatment go through less pain and anxiety
透過目鏡欣賞視像，能有效減低病人在醫療過程中的痛楚和焦慮

More than 100 patients from Beijing and Hong Kong were involved in the clinical evaluation carried out from 2011 to mid-2012. Preliminary results revealed children from the age of eight and adults showed significant improvement after one month of treatment. ASTRI's vision training device has also been proved much more effective for children under the age of 10 than traditional eye-patch therapy which requires a treatment period of at least one year.

High-speed Digital Pathology

The high-speed digital pathology (HSDP) system involves several proprietary technologies on high-speed imaging and focusing, as well as whole slide stitching and viewing. This versatile system not only offers high-speed slide scanning for bright field microscopy, but can also be potentially upgraded for high-speed 3D slide scanning and high-speed fluorescence microscopy.

For the bright field scan mode, the system can complete an area of 15mm x 15mm with on-the-fly auto focusing within one minute at the resolution equivalent to a microscopy view at 400x magnification. Besides digital pathology application, the system can also be used in the semiconductor field for applications such as micron-sized imaging sensor inspection.

Immersive Distraction Goggle

The immersive distraction goggle (IDG) system is a custom-made video system that isolates patients from the medical environment, distracting their attention from the possibly painful medical treatment to video entertainment. Positive feedback from trials on patients proves the system can effectively alleviate pain and anxiety during medical treatments. The IDG system has been deployed in one public hospital and the first mobile physiotherapy service van in Hong Kong to collect more feedback.

High-speed Whole Slide
Digitalization System
高速全切片數碼掃描系統

Minimally Invasive Surgery Goggle

Through the collaboration with the Minimally Invasive Surgery (MIS) Centre in a local hospital, a preliminary ergonomic design of video goggle for MIS surgeons to wear during operations was completed. The goggle can enhance operation effectiveness by eliminating distractions in the environment and surgeon fatigue due to awkward posture.

本項目在二零一一至一二年年中進行了初步臨床測試，共有百多位來自北京和香港的弱視病人參與。初步結果顯示八歲以上兒童及成人在使用該系統進行一個月的訓練治療後，視力得到顯著改善。測試還發現此療程對十歲以下的弱視兒童有效，遠比用眼罩遮蓋正常眼睛，療程至少需要一年的傳統方法效果更佳。

高速數碼病理系統

高速數碼病理系統採用了包括高速成像、聚焦、圖像拼接和瀏覽等多項專利技術。此系統不僅可用於明場全切片高速掃描，還可以升級用於高速三維切片掃描及螢光切片掃描。

對於明場顯微成像，此系統可在一分鐘內自動對焦完成15x15毫米的四百倍放大率的掃描。此系統不僅可用於數碼病理，還可用於半導體產品，例如微米級成像傳感檢測。

沉浸式分散注意力目鏡

沉浸式分散注意力目鏡系統能把病人從醫療過程和環境中抽離，分散病人的注意力，從可能引起痛楚的醫療過程轉移至影視娛樂。試用者的回應十分正面，証明這系統能有效減輕病人在治療過程中感受到的痛楚和焦慮。沉浸式分散注意力目鏡系統已在一所公立醫院和全港首部流動物理治療車中使用，以蒐集更多用戶反饋。

微創手術目鏡

通過與一所公立醫院的微創手術中心合作，專為微創手術外科醫生進行手術而設計並符合人體工學的手術目鏡雛形已經確立。醫生進行微創手術時配戴此目鏡可免環境干擾，並可減除因彎扭的手術姿勢而引致的疲勞。

COMMERCIALIZATION
市場化

Licensing of High-speed Digital Pathology

BME signed a non-exclusive licensing agreement with a customer for technologies developed in the HSDP project. High-speed imaging and focusing technologies required in high throughput whole slide imaging applications were transferred to customer. The technologies will help increase the customer's competitiveness in digital pathology.

Brain Training Device in Remote Training Mode

With encouraging clinical results, some potential customers have shown interest in licensing ASTRI-patented amblyopia treatment algorithm. To facilitate future use and enhance commercial value, the Team is offering development options of remote amblyopia training for applications in market available devices such as tablets with Android or iOS platforms. BME is modifying the necessary system architecture, modulating existing workflow for screening and treatment of amblyopia, thus better facilitating the remote telehealth platform with evolving smartphones and tablet technology. Apps licensing can be one-time or periodical subscriptions with software updates. Patient management software is also being considered for eye-care products and services.

MEMS Sensor

BME completed a contract research project for a company based in Hong Kong Science Park. The project involved MEMS sensor design for healthcare applications which was successfully completed and delivered on schedule. Currently, the Team is working with the customer on verification tests of the MEMS sensors fabricated by a foundry. Once a MEMS sensor device out of the design matrix becomes fully validated, the Team can expect a new contract with the company to prepare the design for pilot production.

高速數碼病理系統授權

生物醫學電子組以非獨家形式將高速數碼病理系統技術授權予一個客戶。這些技術主要包括掃描系統必需的高通量全切片的高速成像和聚焦功能。這些技術將大幅提高客戶在數碼病理領域的競爭力。

弱視治療腦訓練系統的遠程醫療平台

弱視治療項目的成功臨床結果，吸引一些潛在客戶與應科院洽談專利弱視治療算法的技術授權。為開發未來應用和提高商業價值，生物醫學電子組計劃提供遠程弱視訓練的商業方案，應用程式可在Android或iOS平台上使用。小組正在改進必要的軟件架構，模組化現有的流程，分開弱視檢查和治療，令遠程醫療平台可更有效地使用，配合智能手機和平板電腦技術的演變。應用程式容許用戶以一次性或定期性訂購，並提供軟件更新。小組也正考慮為眼部護理的產品及服務市場開發病人管理軟件。

微機電感應器

生物醫學電子組為一家以香港科學園為基地的公司完成了一項合約研究項目。此項目開發了一款可應用於醫療保健的微機電感應器，小組已按要求如期完成設計開發並交付給客戶。小組正與委託公司進行微機電感應器的測試，若微機電感應器之效能得到驗證，小組預期可與合作夥伴簽訂新合約，令微機電感應器的設計達到量產標準。

Dr. Wu Xiaohua, Manager
Headed three projects on digital pathology development, filed three patent applications and completed a technology transfer
吳曉華博士，經理
迄今主導了三個數碼病理項目，三項專利申請及一項技術轉移

BIO-MEDICAL ELECTRONICS TEAM
生物醫學電子組

FUTURE DEVELOPMENT AND PROJECT HIGHLIGHTS
未來發展及研發項目

Telecare

The BME Team has dedicated efforts to developing a telehealth system since 2011, positioning towards the periphery of telecare applications in association with users and their desired human interfaces. The Team focuses on solution engineering, which involves improving the practicability of modern equipment to meet the special requirements of healthcare applications.

The Team anticipates further expansion of ICT will facilitate elderly and patient care in hospital and at home. Telecare services will be extended to cover technology support for community assistance centres and home care of disabled, as well as support for family members to supervise health-caring processes of patients. Since the medical community has different practices and legal liabilities, implementation protocols have to be custom-made to suit the special needs of end-users.

遠程醫療

生物醫學電子組自二零一二年開始已致力發展遠程醫療系統。小組關注開發周邊用戶和他們所需的人機界面與遠程護理的應用。小組致力提供解決方案工程，當中涉及改良市場現有的設備，來切合醫療保健的獨特需求。

小組預期隨著資訊和通訊技術的發展，在家或在醫院照顧老人和病人將會變得更方便。遠程醫療服務將進一步擴充，涵蓋社區援助中心的技術支援、殘疾人士在日常生活的照顧，以及協助病人家屬監督病人健康照料流程。由於醫學界有一套既定的做法和法律責任，當中需要針對性的技術設定，以滿足最終用戶的要求。

Computer-aided Pathology Diagnosis
電腦輔助病理診斷

Pathology slide digitization including digital slide generation, management and interpretation are powerful tools for Computer-aided Diagnosis

數碼病理切片技術，包括數碼切片的產生、管理和分析，是實現電腦輔助診斷的有效工具

Digital Pathology

Current pathology diagnostics in hospitals and laboratories are carried out by visually inspecting glass slides using optical microscopes. This practice not only prevents convenient case sharing and consultation among pathologists, but also heavily relies on the experience of individual pathologists whose judgment can be affected by intrinsic subjectivity and variation.

Computer-aided diagnosis (CAD) can address these problems and facilitate pathologists to provide better service to patients. Digital pathology, including digital slide generation, management and interpretation, are powerful tools for pathologists to seamlessly adapt CAD to their routine workflow.

Having successfully developed a high-speed slide digitization system with proprietary imaging and focusing technologies and a whole slide viewing software with zoom and pan functions, BME is currently working closely with pathologists, cytologists and microbiologists to develop case specific CAD modules for fast and accurate diagnostics.

Diagnostic Instrumentation and Chinese Medicine

Traditional Chinese medicine (TCM), encompassing different practices such as herbs and acupuncture, is rooted in the ancient philosophy of Yin-Yang, Five-Phase Theory and Taoism. Dating back more than 3,000 years, the practice has been proved effective. Today, TCM is practiced side-by-side with Western medicine in many places of the world.

However, the four traditional diagnostic systems of TCM – visual inspection, auscultation, questioning and palpation, completely rely on the practitioner's sensory elements such as eyes, ears and fingers, as well as his/her experience to affect diagnostic results.

To reduce the impact of human variance on TCM practice, BME is developing a diagnostic equipment to mimic the practitioner's use of human sensory to assess patient's physical condition. The TCM diagnostic instrument when successfully developed not only can assist practitioners during diagnosis, but also can help generate objective data for analyses during clinical trials of Chinese medicine.

數碼病理

目前一般在醫院或化驗所進行的病理診斷，都是透過光學顯微鏡對放大了的病理切片影像進行檢查和判斷。這種方法不僅令病理醫生之間的遠程會診變得困難，還使得診斷結果因個別病理醫生的不同經驗而存在主觀性和差異性。

電腦輔助診斷可以有效解決這些問題，從而幫助病理醫生為患者提供更優質的服務。數碼病理，包括數碼切片的產生、管理和解讀，是幫助病理醫生將電腦輔助診斷應用到日常工作流程中的有效工具。

生物醫學電子組繼成功開發出高速切片掃描系統，以及具備專利成像和對焦技術的全切片瀏覽軟件後，現正積極聯繫資深病理醫生、細胞學家和微生物學家，合作開發針對某些疾病的電腦輔助診斷模塊，來提供更快和更準確的病理診斷。

傳統中醫藥之四診儀

傳統中醫藥包含多種醫療方法如草藥、針炙等，均源於遠古之陰陽、五行和道家的智慧。中醫藥經過三千年的漫長歷史，其成効是無庸置疑的。時至今日，傳統中醫藥與西方醫藥在世界各地同樣受到重視。

然而，傳統中醫藥的四大診症方法 — 望、聞、問、切均依賴中醫師之眼、耳和手指的感覺，還有醫師診症的經驗，都會影響診斷結果。

因此，生物醫學電子組正努力開發一款可模擬中醫師以感官為病人檢查身體狀況的四診儀，以減低人為因素引起的診斷誤差。四診儀若研發成功，不但能輔助中醫師應診，也可以為中醫藥臨床驗證提供客觀的參考數據。

MEMS

BME continues to provide consultation in MEMS device design. From design, simulation to wafer level test, the Team provides a complete solution to shorten development cycle and reduce costs and risks for customers. The Team's design experience and capabilities cover widely from optical MEMS mirror, MEMS inkjet print-head to MEMS flow sensor.

微機電系統

生物醫學電子組會進一步提供微機電元件 (MEMS)設計服務。從MEMS器件設計與特性模擬以至晶圓測試，小組都能提供完整的解決方案，為客戶縮短設計開發週期、減低成本及投資風險。小組的設計經驗和能力涵蓋光學微機電鏡子、微機電噴墨列印頭和微機電流量感應器。

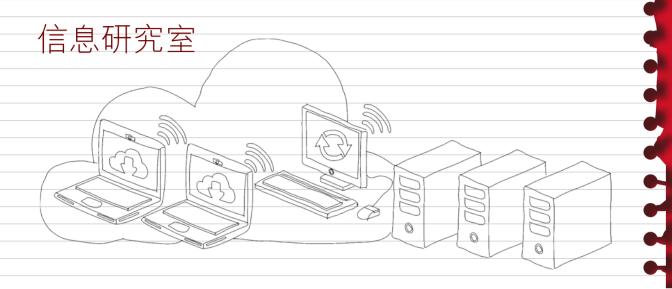Pulse Sensing Machine used in traditional Chinese medicine diagnosis
用於中醫診斷學的脈診儀

P Platform Project
平台項目
S Seed Project
種子項目

	Project 項目	Duration 時期
1 S	Use of Innovation and Technology in Enhancing Quality of Life of the Elderly 利用創新科技改善長者生活	Nov 2011 – Apr 2012 二零一一年十一月至二零一二年四月
2 P	High-speed Digital Pathology System 高速數碼病理系統	Feb 2012 – Aug 2013 二零一二年二月至二零一三年八月
3 P	Diagnostic MR Elastography Device (Palpategram) 彈性成像診斷儀（觸診儀）	Jul 2010 – Jul 2012 二零一零年七月至二零一二年七月
4 S	Minimally Invasive Surgery Goggle 微創手術目鏡	Jan – Jun 2012 二零一二年一月至六月
5 S	Immersive Distraction Goggle 沉浸式分散注意力目鏡	Apr – Oct 2012 二零一二年四月至十月
6 S	Cardiovascular Assessments via Chinese Medicine Approach 利用中國醫術進行心臟血脈評估	Jan – Jul 2013 二零一三年一月至七月

EXPLORATORY RESEARCH LABORATORY

信息研究室

During the year, the Exploratory Research Laboratory (ERL) continued its mission of exploring emerging technologies which have business potentials and social benefits.

Responding to the increasing demand for high quality cloud computing services, ERL focused efforts on developing cloud technologies to enhance storage security and virtual networking and to enable inter-cloud communication and cooperation. With these technologies, future cloud services can be more secure, reliable and economical. An ongoing seed project on cloud computing paves the way for a platform project and a possible industry collaborative project to be launched in the coming year.

In addition to cloud computing, ERL will continue exploring emerging technologies in different areas, including big data analytics, mobile application and artificial intelligence.

過去一年，信息研究室繼續致力研發具潛在商業價值和對社會有利的新興科技。

鑒於市場對高質素雲計算服務的需求日增，信息研究室集中研發雲科技，加強雲存儲安全與促進虛擬網絡發展的技術，目的是實現不同雲系統之間的訊息交互與協作。基於以上技術，將來的雲服務必定更加安全可靠和經濟實用。信息研究室正通過當下的種子項目累積經驗，為之後即將展開的平台項目與業界合作項目打下基礎。

除雲計算科技外，信息研究室還將繼續探索不同領域的前沿科技，諸如大數據分析、移動應用和人工智能。

= **1** number 數目 = **0.1** million HK$ 百萬港元

Agreement Signed
簽訂合約

Income Received from Industry*
從業界所得收入 * 0.1

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

Cloud Resource Management
雲端資源管理

The efficient management of hardware resources is ERL's
key research area in cloud computing
如何有效管理硬件資源是信息研究室在雲計算方面的重點
研究課題

INNOVATIONS
技術突破

Big Data Management System
大數據管理系統

Big Data Analytics help enterprises discover valuable information from the data
大數據分析有助企業從數據中發掘重要信息

Cloud Resource Management Technology

Infrastructure-as-a-Service (IaaS) is one of the most widely-adopted cloud computing services. With IaaS, users can request virtual computing resources for their applications via the Internet and easily scale up or down resource provisions according to need.

A key component in providing IaaS service is cloud resource management software, which is responsible for managing physical computing resources in the cloud system and creating custom-configured virtual machines according to user requirements.

In a previous seed project, ERL developed a cloud resource management system prototype with reference to open source technologies. To enhance functionalities in the cloud resource management system, the current seed project develops new technologies in storage security, virtual network and virtual machine monitoring.

雲資源管理技術

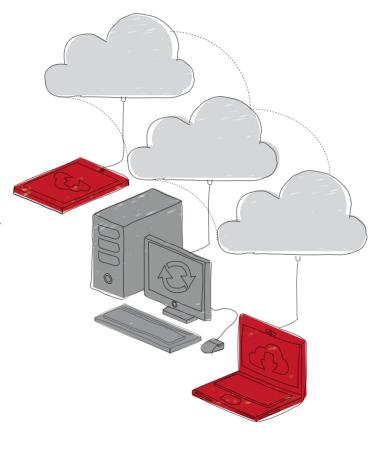「基礎設施即服務」是目前被廣泛應用的一種雲服務模式。在此模式之下，用戶可以通過網絡獲取虛擬的計算資源，並可以根據實際需求調整資源的用量。

雲資源管理系統是提供「基礎設施即服務」的關鍵，它負責管理雲系統中的物理機，並根據用戶需求創建虛擬機。

在之前的種子項目中，信息研究室基於開源軟件開發了一套雲資源管理系統的原型。為增強雲資源管理系統的性能，當下這個種子項目旨在研發關於安全存儲、虛擬網絡和虛擬機監控等方面的科技。

Cloud Interoperability Technology

Another important ERL innovation during the year is cloud interoperability technology. Cloud operators may want to connect their cloud services with other operators to leverage resources and off-load burst demands. Cloud users may also like to have a choice of cloud service providers according to price, performance and data centre location.

In light of this demand, ERL is developing an inter-cloud federation controller prototype which can create and manage virtual machines in a remote cloud platform without requiring users to apply for new accounts in another cloud.

雲間協作技術

年內，信息研究室的另一項重要技術突破是雲交互技術。雲平台的運營商通常希望將他們的雲平台與其他運營商相聯，以共享資源、分擔突發性需求。雲平台的用戶往往也希望有不同的運營商，讓他們可以先比較價格、性能及其地理位置，然後作出選擇。

為回應此需求，信息研究室正致力開發「雲間協作控件」的原形。此控件可以協助用戶跨平台地創建與管理虛擬機。它不僅可以幫助用戶訪問不同地域的雲資源，還免除了用戶需要在不同的雲平台注冊新帳號的煩瑣。

Inter-cloud is a new mode of collaboration between clouds
互聯雲是雲際合作的新模式

Mr. Huang Nan, Senior Engineer
Took part in R&D on cloud management technologies
黃楠，高級工程師
參與雲管理技術之研發

FUTURE DEVELOPMENT AND PROJECT HIGHLIGHTS
未來發展及研發項目

Research focus on cloud computing will be in multiple cloud management and inter-cloud communication mentioned above, as well as domain specific applications and appliances.

ERL will also pursue opportunities in big data analytics. Big data refers to a collection of data sets so large and complex that they cannot be transferred or processed using traditional methods. It is widely accepted that insights extracted from big data enable enterprises and government to make better decisions.

ERL envisages that cloud resources is advantageous to big data processing and that Big-Data-as-a-Service will become a new type of cloud service benefiting modern society. ERL will focus on cloud-facilitated big data analytics and develop technologies to enable Big-Data-as-a-Service to meet market needs.

在雲計算方面，信息研究室目前側重於研發跨平台的雲管理技術、雲間通訊技術，以及特定領域的雲應用和雲設備。

信息研究室也將繼續探索大數據分析領域的技術。「大數據」通常是指一套信息量龐大複雜以致於無法用傳統方式傳輸和分析的數據。目前，大數據的價值已被廣泛認可，其對企業與政府制定策略方面具有巨大的參考價值。

信息研究室認為大數據分析可以得益於雲計算技術，「大數據即服務」將會成為一種新的雲服務模式。信息研究室將致力研發基於雲平台的大數據分析技術，目的是實現「大數據即服務」的運營模式以迎合當下的市場需求。

Return of investment in advertising is improved by analyzing historical data
通過分析歷史數據，可提高廣告的投資回報率

ASCloud Management System allows user to manage cloud resources through a self-service web interface
ASCloud雲管理平台讓用戶可以通過一個自助的網絡界面管理雲資源

Project 項目	Duration 時期
Scalable and Interoperable Cloud Management Technologies 可擴充及協作的雲系統管理技術	Nov 2012 – Jul 2013 二零一二年十一月至二零一三年七月

Seed Project
種子項目

A YEAR IN CAPSULE
大事紀要

19-22/04
2012

ASTRI showcased e-learning technologies and achievements at the 6th Electronics and Information Fair in Hangzhou and was given the special award "An Exhibitor Giving the Best of Experience to Visitors". The technology demo attracted many representatives from the Zhejiang Government and enterprises including Vice Governor Mr. Mao Guanglie (fourth from right) and Hangzhou City Vice Mayor Ms. Tong Guili (first from right).

應科院在「第六屆中國杭州電子資訊博覽會」展出電子學習技術及成果，並獲頒「最佳體驗參展企業」獎項。現場技術演示吸引浙江省和杭州市多名政企代表參觀，包括副省長毛光烈先生(右四)及副市長佟桂莉女士（右一）。

04 APRIL

05 MAY

19/05
2012

A group portal built by ASTRI for Hong Kong scouts was unveiled on Scout Tech Day by the Scout Association. The portal was expected to enhance communication among the ten thousand scouts in Hong Kong. ASTRI also provided storage space, backup and maintenance support to users.

應科院為香港童軍建設一個旅團網站，香港童軍總會在「童軍資訊科技日」當天公佈網站的成立。預期該網站管理系統能有助本港近十萬名童軍之間的溝通。應科院也為童軍旅團用戶提供儲存空間、備份服務及技術支援。

05
2012

ZTE Corporation, a leading global provider of telecommunication equipment and network solutions, completed the world's first LTE TDD/FDD packet-switched hand-over test with ASTRI's LTE dongle. The test provided the foundation for seamless communications between different LTE modes in the future.

全球領先的電訊器材及網絡方案供應商中興通訊，利用應科院的LTE數據卡，完成了全球首次LTE TDD/FDD系統間雙向PS切換性能驗證測試，為實現未來不同LTE網絡之間切換時的無縫連接打下堅實的基礎。

23/05
2012

ASTRI, Po Leung Kuk and Centres of Excellence on IT in Education of the Education Bureau co-organized a mobile interactive learning game "Digital Travel in Ocean Park 2012". A total of 40 students from 20 primary schools in Hong Kong and Shenzhen participated in this fun-filled event using the tablet PC "PAL" (Personal Assistant for e-Learning) developed by ASTRI.

應科院、保良局及教育局資訊科技教育卓越中心合辦「海洋公園遊蹤2012」無線互動學習比賽。共四十名來自本港和深圳二十間小學的學生參賽，利用應科院開發的「易學夥伴」平板電腦進行遊戲。

18-22/06
2012

An 11-member delegation from ASTRI took part in the "Tenth China Cross-Straits Technology and Projects Fair" in Fuzhou. ASTRI's Dr. Justin Chuang (third from left) welcomed Fujian Party Secretary Ms. Sun Chunlan (second from right), and Governor Mr. Su Shulin (third from right) who visited the ASTRI booth.

應科院十一人代表團前往福州參展「第十屆中國‧海峽項目成果交易會」。圖為應科院莊哲義博士（左三）熱情接待福建省委書記孫春蘭女士（右二）及省長蘇樹林先生（右三）。

24-31/08
2012

ASTRI sponsored the Joint School Science Exhibition for the fourth consecutive year, showing support for young scientists and encouraging them to apply their innovations to daily life.

應科院連續第四年贊助聯校科學展覽，以表示對青年科學家的支持並鼓勵他們將創意融入生活。

06 JUNE　　**07 JULY**

03/07
2012

Governor Su Shulin (left) of Fujian Provincial People's Government led a government and business delegation to visit ASTRI to enhance mutual exchanges and collaboration.

福建省人民政府蘇樹林省長（左）率領政企代表團造訪應科院，增進雙方交流和加強合作。

22/08
2012

ASTRI exclusively licensed embedded DSP and L1 control software of UE baseband technology to Innofidei (Hong Kong) Technology Ltd. The collaboration also involved transferring 26 ASTRI researchers to continue their R&D work in LTE at the research centre set up by Innofidei in Hong Kong Science Park.

應科院將終端基帶技術的嵌入式DSP和L1控制軟件以獨家形式授權予創毅微電子（香港）科技有限公司。除了技術轉移，應科院的二十六位研究人員隨後加盟創毅於香港科學園開設的研發中心，繼續他們在 LTE方面的研發工作。

08 AUGUST

09 SEPTEMBER

5 & 19/09
2012

The 2012 ASTRI Industry and University Consultation Forum was successfully held in Hong Kong and Shenzhen, offering platforms for close to 700 participants from industry and academia to gain a better understanding of ASTRI technologies and to explore collaboration opportunities.

二零一二年度應科院科技項目推介會於香港和深圳成功舉行，吸引了接近七百位學術界及產業界人士參與，藉此機會進一步認識應科院的科技和探討合作機會。

27/09
2012

ASTRI received approval from the Ministry of Science and Technology (MOST) to establish the "Hong Kong Branch of the National Engineering Research Centre for Application Specific Integrated Circuit System" in collaboration with Nanjing's Southeast University. The plaque unveiling ceremony was officiated by Dr. Cao Jianlin (fourth from right), Deputy Minister of MOST; Mr. Gregory So (fourth from left), Secretary for Commerce and Economic Development of the HKSAR Government; Ms. Yan Xiaojing (third from right), Deputy Director, Liaison Office of the Central People's Government; and Prof. Philip Chan, Chairman of ASTRI's Technology Committee (third from left).

應科院獲國家科學技術部（科技部）批准，與南京東南大學合作成立「國家專用集成電路系統工程技術研究中心香港分中心」。主持揭牌典禮嘉賓包括國家科技部副部長曹健林博士（右四）、香港特區政府商務及經濟發展局局長蘇錦樑先生（左四）、中央人民政府駐香港特別行政區聯絡辦公室主任殷曉靜女士（右三），以及應科院科技委員會主席陳正豪教授（左三）。

09 SEPTEMBER   10 OCTOBER

31/10
2012

2010/11 Annual Report themed "Sparks of Innovations" was awarded Best New Entry in the HKMA Best Annual Reports Awards. CEO Dr. Cheung Nim-kwan (middle) represented ASTRI to receive the certificate.

以「創意之源」為主題的應科院二零一零／一一年年報，在香港管理專業協會最佳年報比賽中獲得「最優秀新參賽年報獎」。行政總裁張念坤博士（中）代表應科院接受獎狀。

10
2012

ASTRI launched its Facebook fan page in October 2012 as another strategic move to reach out to a wider audience, especially the younger generation. In just a few months after the launch, more than 1,000 Facebook users became ASTRI fans.

應科院於二零一二年十月推出臉書專頁，以進一步擴闊群眾的接觸面，尤其是年輕人。專頁推出僅數月，已吸引超過一千名粉絲關注。

11 NOVEMBER

3-11/11
2012

With the objective of promoting use of technologies to improve lifestyle, ASTRI participated in the InnoCarnival for the third year and showcased its new technologies under the theme "Explore New Technologies • Enjoy e-Living". The annual show was organized by the Innovation and Technology Commission in Hong Kong Science Park.

應科院以「探索新科技•享受新生活」為主題 ，在香港科學園舉行的「2012創新科技嘉年華」展出各種新技術。今年已是本院連續第三年參展這個活動，目的是透過展覽讓廣大市民了解如何利用科技享受現代化生活。

14-17/11 2012

IEEE Asia Pacific Cloud Computing Congress 2012 was successfully concluded in Shenzhen, attracting nearly 300 industry leaders from around the world. The congress was a major event of IEEE's cloud computing initiative. ASTRI was a co-organizer and silver sponsor. CEO Dr. Cheung Nim-kwan (fourth from left) assumed the role of Steering Committee Chair.

亞太區雲計算大會於深圳圓滿舉行，吸引接近三百位來自世界各地業界領袖參加。是次會議是IEEE雲計算先導計劃的主要項目。應科院提供協辦和銀贊助，行政總裁張念坤博士（左四）則擔任大會的倡導委員會主席。

11 NOVEMBER

20/11 2012

ASTRI's Board of Directors won the "Directors of The Year Awards 2012" (statutory/non-profit-distributing organization category) organized by The Hong Kong Institute of Directors. Chairman Dr. Patrick Wang (second from left) represented the Board to receive the trophy.

應科院董事局獲香港董事學會頒發「2012傑出董事獎」(法定／非分配利潤組織董事局組別)榮譽。主席汪穗中博士（左二）代表董事局上台接受獎座。

03
2013

ASTRI's innovative technologies won a number of honours in the Hong Kong ICT Awards which included Gold Award for ALS System, Silver Award for Green Power Smart Wireless Sensor, and Certificate of Merit for Wireless Motion Sensing Module for LED Lighting System.

應科院在「香港資訊及通訊科技獎」中，以一系列創新科技贏得多項榮譽，包括以ALS系統獲金獎，自供電智慧無線感測器獲銀獎，以及為LED燈光控制而開發的無線移動感應器模組獲優異獎。

12/03
2013

Legislative Council President, Mr. Jasper Tsang Yok-sing (middle), who is also Supervisor of Pui Kiu College, led representatives from the Pui Kiu Education Foundation to visit ASTRI. The guests were warmly received by CEO Dr. Cheung Nim-kwan (third from right) and senior management representatives.

立法會主席及培僑書院校監曾鈺成先生（中）率領培僑教育機構代表到訪應科院。本院行政總裁張念坤博士（右三）率管理層熱烈歡迎來賓。

03 MARCH

03/03
2013

Led by CEO Dr. Cheung Nim-kwan, more than 70 enthusiastic ASTRI staff with their families and friends took part in the New Territories Walk organized by the Community Chest to raise fund for "Family and Child Welfare Services". About $23,000 was raised for the good cause.

在行政總裁張念坤博士帶領下，一班應科院熱心員工帶同親友共七十餘人，參加由公益金舉辦的新界區百萬行，共同為「家庭及兒童福利服務」籌款，此次善舉籌得善款約二萬三千元。

FINANCIAL REPORT

財務報告

OVERVIEW
概況

For FY2012/13, the net income before tax and plough back to the Government amounted to HK$13,085,012, of which HK$9,120,079 will be ploughed back to the Government.

The income for the year amounted to HK$447,263,731. The funds from the Government comprised HK$133,273,305 from recurrent subvention, HK$243,442,610 from ITF project funds, HK$306,030 from ITF General Support Programme, HK$1,251,404 from Public Sector Trial Scheme and HK$3,777,590 from ITF Internship. The total income from the industry increased from HK$62,421,720 in FY2011/12 to HK$64,850,345 in FY2012/13, the increase was mainly due to the increase in contract research activities, which the industry funded 100% of the research cost.

The total expenditure of recurrent subvention amounted to HK$136,463,503, an increase of 2.5% compared with the previous year. ASTRI's operation remained steady with prudent financial management throughout the year.

The total expenditure of the R&D projects amounted to HK$266,121,868, of which 74% of the expenditure was spent on manpower and 26% of the expenditure was spent on equipment and other direct costs. The total expenditure mainly comprised the actual cash outflow incurred during the year for 59 full projects, 27 seed projects and 2 public sector trial scheme projects. Meanwhile, the internship expenditure amounted to HK$3,777,590, which represented the actual cash outflow of salary payment for interns engaged in 32 full projects.

The consolidated accounts for the year ended 31 March 2013 of ASTRI and its subsidiary, ASTRI Science and Technology Research (Shenzhen) Company Limited, have been audited by the external auditor with a clean audit opinion and extracts of the Consolidated Statement of Comprehensive Income and Consolidated Statement of Financial Position are set out in the following pages.

應科院在二零一二／一三年度，未計入稅項和回饋給政府前的收益，總額為港幣13,085,012元，其中港幣9,120,079元將回饋給政府。

全年收入為港幣447,263,731元。來自政府款項包括經常性撥款港幣133,273,305元；創新及科技基金的研發經費港幣243,442,610元；創新及科技基金的一般支援計劃資助港幣306,030元；公營機構試用計劃資助港幣1,251,404元及創新及科技基金的實習研究員計劃資助港幣3,777,590元。從業界所得的總收入由二零一一／一二年度的港幣62,421,720元增加至二零一二／一三年度的港幣64,850,345元。增幅主要來自業界負責全部研發費用的合約研究項目。

經常性撥款的總支出為港幣136,463,503元，比去年同期增加約2.5%。應科院保持穩定經營及繼續以審慎原則執行財務管理。

研發項目的總開支達港幣266,121,868元，當中74％用於人力資源，26%用於儀器及其他直接開支。總開支主要為五十九個正式項目，二十七個種子項目和兩個公營機構試用計劃項目的實際現金支出。同時，實習研究員計劃支出為港幣3,777,590元，為實習研究員參與三十二個正式項目的實際薪酬支出。

應科院及其附屬機構應科院科技研究〈深圳〉有限公司全年截至二零一三年三月三十一日止的綜合賬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。

CONSOLIDATED STATEMENT OF COMPREHENSIVE INCOME
綜合全面收益表

For the year ended 31 March, 2013 截至二零一三年三月三十一日止年度		2013 (HK$) 二零一三年（港幣）	2012 (HK$) 二零一二年（港幣）
Subvention	**資助**		
Income from Government subvention	政府資助收入	133,273,305	130,290,388
Administrative expenses	行政支出	(136,463,503)	(133,048,578)
Deficit on subvention	資助虧損	(3,190,198)	(2,758,190)
Project Funding from Innovation and	**創新及科技基金及**		
Technology Fund and	**業界投入資金**		
Industry Contribution			
Project fund income	項目收入		
– Innovation and Technology Fund	– 創新及科技基金	243,442,610	266,721,501
– Industry contribution	– 業界投入資金	22,679,258	28,932,204
Project expenditure	項目支出	(266,121,868)	(295,653,705)
Balance on project funding	項目資金餘額	–	–
Project Fund Income:	**項目資金收入：**		
General Support Programme	**一般支援計劃**		
– Innovation and Technology Fund	– 創新及科技基金	306,030	414,870
– Industry contribution	– 業界投入資金	43,720	50,172
Project expenditure	項目支出	(349,750)	(465,042)
Balance on project funding	項目資金餘額	–	–
Project Fund Income:	**項目資金收入：**		
Public Sector Trial Programme	**公營機構試用計劃**		
Innovation and Technology Fund	創新及科技基金	1,251,404	–
Project expenditure	項目支出	(1,251,404)	–
Balance on project funding	項目資金餘額	–	–
Internship Funding from Innovation	**創新及科技基金的**		
and Technology Fund	**實習研究員計劃基金**		
Internship fund income	實習研究員計劃資助收入	3,777,590	3,845,761
Internship expenditure	實習研究員計劃支出	(3,777,590)	(3,845,761)
Balance on internship funding	實習研究員計劃資助餘額	–	–
Project Funding from The Hong Kong	**香港賽馬會項目基金**		
Jockey Club			
Project fund income	項目資助收入	362,447	6,080,477
Project expenditure	項目支出	(362,447)	(6,080,477)
Balance on project funding	項目資助餘額	–	–
Other Net Income	**其他淨收入**		
Other income	其他收入	42,127,367	33,439,344
Other expenses	其他支出	(25,852,157)	(20,478,752)
Other net income	其他淨收入	16,275,210	12,960,592

For the year ended 31 March, 2013 截至二零一三年三月三十一日止年度		2013 (HK$) 二零一三年（港幣）	2012 (HK$) 二零一二年（港幣）
Amount Refund to the Government of the Hong Kong Special Administrative Region	退還香港特別行政區 政府款項	(9,120,079)	(10,759,812)
Surplus (Deficit) Before Taxation	稅前盈利（虧損）	3,964,933	(557,410)
Taxation Credit	稅收抵免	125,392	251,482
Surplus (Deficit) for the Year	本年度盈利（虧損）	4,090,325	(305,928)
Other Comprehensive Income	其他全面收入		
Exchange difference arising on translation	外幣報表換算差額	11,056	20,248
Surplus (Deficit) and Total Comprehensive Income (Expense) for the Year	本年度盈利（虧損）及 全面總收入（支出）	4,101,381	(285,680)
Surplus (Deficit) for the Year Attributable to:	本年度盈利（虧損）分配於：		
Owners of the Company	公司擁有人	4,106,958	(291,634)
Non-controlling interests	非控股權益	(16,633)	(14,294)
		4,090,325	(305,928)
Total Comprehensive Income (Expense) for the Year Attributable to:	本年度全面總收入 （支出）分配於：		
Owners of the Company	公司擁有人	4,118,014	(271,386)
Non-controlling interests	非控股權益	(16,633)	(14,294)
		4,101,381	(285,680)

CONSOLIDATED STATEMENT OF FINANCIAL POSITION
綜合財務狀況表

At 31 March, 2013 於二零一三年三月三十一日		2013(HK$) 二零一三年（港幣）	2012(HK$) 二零一二年（港幣）
Non-current Asset	**非流動資產**		
Property, plant and equipment	物業、機器及設備	7,115,930	9,677,273
Current Assets	**流動資產**		
Accounts and other receivables	賬戶及其他應收款項	25,401,266	13,003,562
Taxation recoverable	可退回稅項	–	109,311
Bank balances and cash	銀行結餘及現金	203,460,948	235,681,931
		228,862,214	248,794,804
Assets classified as held for sale	分類為待出售的資產	–	33,266
		228,862,214	248,828,070
Current Liabilities	**流動負債**		
Accounts and other payables	賬戶及其他應付款項	56,014,405	38,641,786
Receipts in advance	預收款項	104,817,484	146,645,272
Amount due to the Government of the Hong Kong Special Administrative Region	香港特別行政區政府到期款項	9,138,977	10,173,901
Amount due to The Hong Kong Jockey Club	香港賽馬會到期款項	–	1,013,094
		169,970,866	196,474,053
Net Current Assets	**流動資產淨值**	58,891,348	52,354,017
Total Assets Less Current Liabilities	**總資產減流動負債**	66,007,278	62,031,290
Non-current Liability	**非流動負債**		
Deferred taxation	遞延稅項	(494,228)	(619,620)
Net Assets	**資產淨值**	65,513,050	61,411,670
Capital and Reserves	**股本及儲備**		
Share capital	股本	2	2
Accumulated surplus	累計盈餘	65,453,754	61,346,796
Translation reserve	折算儲備	59,294	48,238
Equity Attributable to Owners of the Company	**本公司擁有人應佔權益**	65,513,050	61,395,036
Non-controlling Interests	**非控股權益**	–	16,634
		65,513,050	61,411,670

CONTACT US
聯絡我們

Please contact the following business representatives from ASTRI's R&D Groups and Teams for information about our technologies and collaboration opportunities.
如欲更深入了解應科院的科技項目及探討合作機會，歡迎與本院各研發群組及小組的業務代表聯絡。

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ASTRI ANNUAL REPORT 2012/13 FEEDBACK FORM

應科院 2012/13 年年報意見收集

The Annual Report is an important communication publication between ASTRI and its stakeholders. To enhance the quality of our reporting, please let us have your views by filling in the form and returning it to Corporate Communications Department by fax (852) 3406 2801 or email corporate@astri.org.

年報是應科院與客戶和大眾維持良好溝通的重要刊物。為提升報告的質量，我們誠邀閣下提供寶貴意見。請填妥此表格並傳真至 (852) 3406 2801 或電郵至 corporate@astri.org，傳訊部收。

1. Please circle the appropriate number:

   請在適當數字上加圓圈：

	It is easy to understand 內容清楚明白					The information provided is helpful 提供有用資料				
	Strongly disagree 非常不同意				Strongly agree 非常同意	Strongly disagree 非常不同意				Strongly agree 非常同意
Chairman's Foreword 主席序言	1	2	3	4	5	1	2	3	4	5
CEO's Review 行政總裁回顧	1	2	3	4	5	1	2	3	4	5
Performance 業績	1	2	3	4	5	1	2	3	4	5
Corporate Governance 企業管治	1	2	3	4	5	1	2	3	4	5
People 人才匯聚	1	2	3	4	5	1	2	3	4	5
Reports of R&D Groups & Teams 研發群組及小組報告	1	2	3	4	5	1	2	3	4	5
A Year in Capsule 大事紀要	1	2	3	4	5	1	2	3	4	5
Financial Report 財務報告	1	2	3	4	5	1	2	3	4	5

Please note that we intend to use the personal data collected here to keep you connected with ASTRI. Please tick the box below to indicate your consent on our sending you information about ASTRI's technologies, services and events by using your email address, correspondence address and other communications channels.

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我們將會使用從這裡取得的個人資料，讓你與應科院保持聯繫。請選取下面的方格，表示你同意我們透過使用你的電子郵件地址、通訊地址和其他通訊方式，把應科院的技術、服務和重要事件傳送給你。

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日後如果你不希望再收到應科院的訊息，請隨時電郵至 corporate@astri. org 向本院私隱合規主任提出。

2. Your overall rating of this Annual Report is (Please circle your answer):

   你給這份年報的總評分為（請在適當位置加上圓圈）：

   Poor 差劣　　　　Fair 尚可　　　　Good 好　　　　Very Good 非常好　　　　Excellent 優異

3. Other comments / suggestions:

   其他意見：

   _____

   _____

Your name and contact details: 請留下姓名及聯絡方法：

Name 姓名 (Ms 女士／Mr 先生)：_____

Company 公司：_____ Position 職位：_____

Email 電郵：_____ Phone No. 電話：_____

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