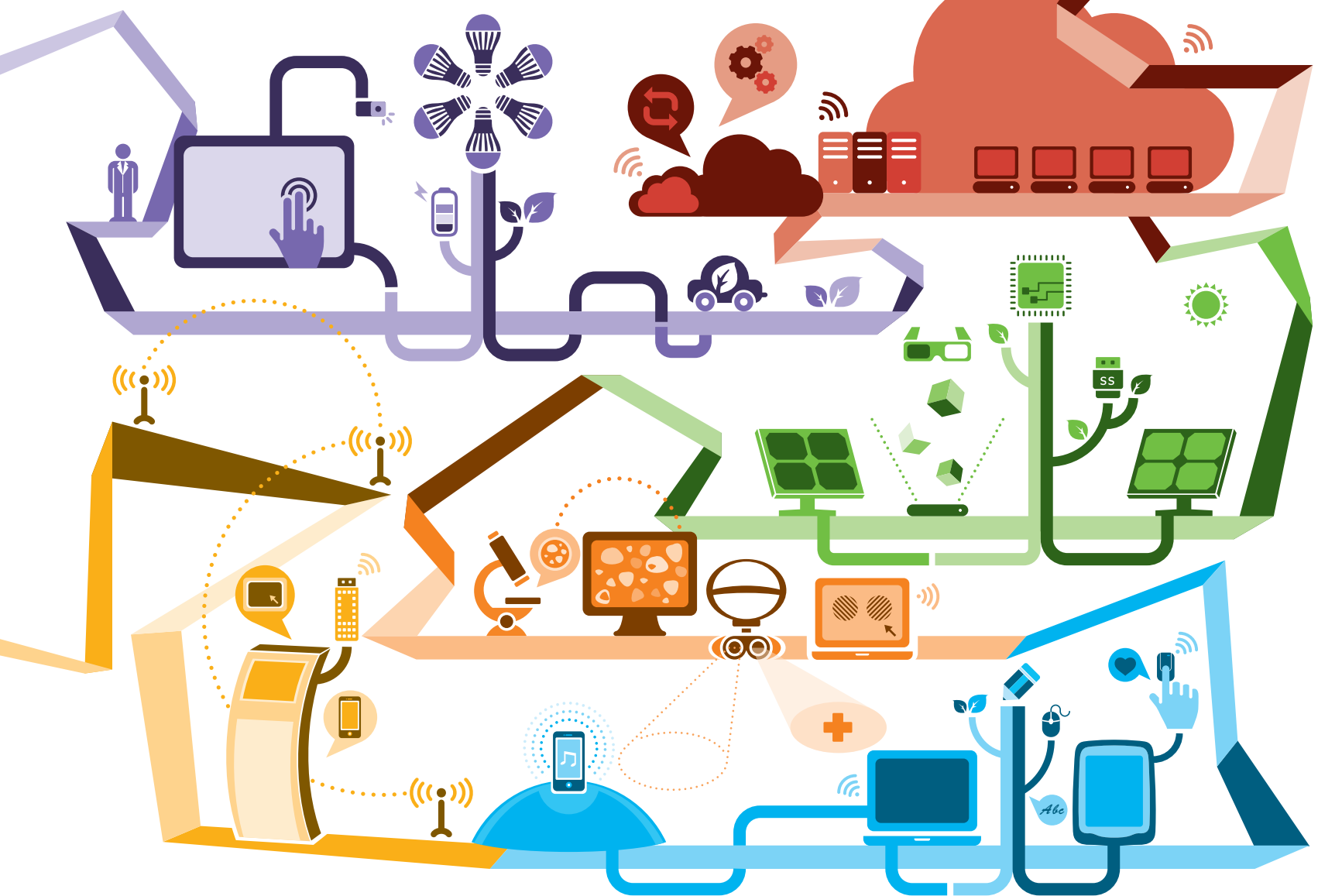# Connecting Minds For Innovations

才 智 匯 聚　　創 科 技 先 河

Annual Report 2011/2012 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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Annual Report
年報

ASTRI builds its strength on its

connection with people, technologies & markets.

We invest in brain capital and deliver to industrial partners state-of-the-art innovations for applications in the markets.
In this way, we facilitate Hong Kong to transform into an intelligent city and its community to embrace changes in the technology world.

應科院研發的科技以人為本,並緊貼市場需求。我們著重培育人才,銳意為市場提供先進及實用的精湛科技,藉此推動香港轉型為知識型社會,協助市民大眾適應科技帶來的種種改變,令生活更豐盛。

Mission
使命

» Enhance Hong Kong's competitiveness in technology-based industries through applied research.
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
進行相關及高水平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 a 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

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。

Values
核心價值

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。

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。

Chairman's Foreword
主席序言

> ❝ Winston Churchill once said: "To improve is to change; to be perfect is to change often."... we welcome new ideas and perspectives not only from the Board, but also from ASTRI colleagues and the general public...
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> 邱吉爾曾經說過：「改善就是改變；要達至完美，便得經常變更。」......我們不僅歡迎來自董事局的新想法和新觀點，也同樣歡迎應科院的同事和廣大市民對我們提供意見......❞

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

As Chairman of the Board, it is my honour and pleasure to present this Annual Report which summarises the Institute's performance and achievements during the year. It also elaborates the strategic direction we believe will successfully pave the way for ASTRI to fulfil its objectives of becoming an innovative, productive, responsible and accountable R&D centre bringing benefits of different dimensions to Hong Kong.

Many of you would agree that ASTRI, after more than a decade of expeditious development, has emerged as a premier R&D centre in Hong Kong and the region. Nevertheless, we allow no room for complacency. During the year, the Board has set the stage for ASTRI's next phase of growth by taking measures to further improve the Institute's business efficiency and elevating its corporate governance.

To increase company earnings, the Board approved the setting up of the Marketing and Commercialization Department to spearhead collective efforts in bringing our technologies to the market. The department has been assigned the important task of championing initiatives to engage industry partners with the focus on matching their needs with our technological capabilities and resources.

我以董事局主席的身份呈上這份年報，深感榮幸和高興。它總結了應科院年內的表現和成績，也闡述了策略性方向；我們相信這些方向能為應科院釐訂方針，讓它實現目標，成為創新、高效、負責和問責的研發中心，為香港帶來各種各樣的裨益。

應科院經過了十多年的迅速發展，已成為香港和區內首屈一指的研發中心。不過我們並未自滿；過去一年，董事局已為應科院下一階段的發展作好準備，並採取措施，以進一步提高其業務效率和提升其企業管治。

為了提高公司的盈利，董事局批准設立市場及商務部，以集結眾人的努力，把應科院的技術推出市場。該部門將致力締結業界合作夥伴，把他們的需要與我們的技術能力和資源加以撮合。

從商業的角度來看，應科院的出品成功與否，跟其他商品和服務並無分別，很大程度取決於如何滿足市場的特定需求。因此，像應科院這樣一個受政府資助的機構，它必須讓其所有成員認同同一個信念，那就是我們的技術須以客戶為中心，並有市場化潛力，而最重要的便是創新。

From the business standpoint, the success of ASTRI's outputs is no different from that of other goods and services which largely depends on how well specific needs of the market are met. Therefore, it is absolutely essential for a publicly funded organization such as ASTRI to achieve a general "buy-in" among all its members to the conviction that our technologies must be customer-focused, marketable and above all, innovative.

The Board agreed that building marketing orientation into the ASTRI culture would bring in long-term benefits to all stakeholders. While it will take time for each and every researcher and engineer in ASTRI to adopt the habit of conceiving innovations from the customer's point of view, the new business approach has prompted the Management to adopt strategic changes in practices and operation. No doubt, our campaign ahead will not be easy and there will be challenges that need to be tackled. But we are confident that we would rise to the challenges and prevail.

On the issue of governance, to encourage and ensure that the highest level of governance is maintained within ASTRI, the Board has constantly reminded staff to closely adhere to policies stipulated clearly in the Corporate Governance Manual. In this regard, a series of mandatory workshops on business ethics and law was conducted for staff during the year by the Management to further strengthen the Company's governance. We are delighted that this company-wide exercise was well received by all levels of staff.

The Board also endorsed a set of company values proposed by the Management. They are: Accountability, Services, Tenacity, Respect and Innovation. These values are indeed what ASTRI stands for, and they will become an integral part of ASTRI culture.

Furthermore, we believe company resources will be used more efficiently and responsibly by implanting processes that lead to better quality output and performance. The Board has therefore directed the Management to renew the certification by ISO of our business processes to ensure all operations would be aptly conducted. We also took the opportunity of reviewing all operational processes regarding administrative and R&D activities by considering the changes and progresses over the past few years.

董事局贊同在應科院的機構文化內注入市場導向的想法，以便為所有持分者帶來長遠利益。雖然，要每一位應科院的研究人員習慣從客戶的角度來構思創新發明，需要一定的過程，但新的經營方針已促使管理層在處事方式和營運上採取策略性轉變。毫無疑問，我們在這方面的前路仍然崎嶇，困難重重，但我們有信心迎難而上，克服挑戰。

為鼓勵和確保應科院保持最高水平的企業管治，董事局經常提醒員工嚴格遵守企業管治手冊中訂明的各項政策。為此，管理層在年內為員工舉行了一系列有關商業道德和法律的強制性工作坊，進一步加強公司的管治。我們很高興，這個涉及全公司培訓的工作受到上下全工的支持。

董事局也對管理層所提議的一套企業核心價值表示贊同，它包括問責、服務、堅毅、尊重和創新。這些價值的確是應科院所追求的，他們將成為應科院文化的重要部分。

此外，我們深信為令業務成果更豐盛而訂定的工作流程，將會使公司的資源更有效地被運用。因此，董事局已指示管理層更新應科院業務流程的ISO認證，以確保所有操作都能恰當及有效地進行。我們也就過去幾年的變化和進展，檢討了有關行政和研發活動的所有運作流程。

董事局亦繼續全力支持管理層採用平衡計分卡框架來制定工作指標和審查及評估年內的主要工作表現。藉著這個有效的方法，應科院各團隊的領導人將能夠清楚地制定、執行、監控和測量在財政、社會使命、顧客、內部不同流程，以及創新和增長等方面的特定目標和指標。無疑，該框架為我們提供了一個平台，以最負責任的方式去提升應科院的表現。

The Board also continued to render full support to the Management to adopt the Balance Score Card framework for reviewing and assessing key performances during the year. Through this effective method, our team leaders will be able to clearly formulate, execute, monitor and measure specific performance objectives and targets in areas concerning finance, social mission, customer, internal process, and innovation and growth. The framework will provide us with a platform to learn and further improve our performance in the most accountable and responsible fashion.

Winston Churchill once said: "To improve is to change; to be perfect is to change often." Meeting the challenges ahead, we welcome new ideas and perspectives not only from the Board, but also from ASTRI colleagues and the general public to jointly steer our future endeavours. With shared vision and total commitment from all concerned, I am certain our next Annual Report will contain reports of exciting progresses and achievements resulted from our efforts.
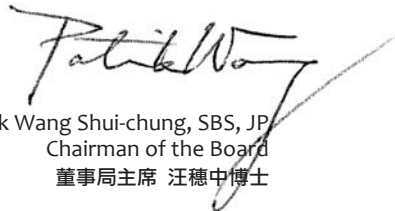
In conclusion, I wish to extend my sincere gratitude to the SAR Government and in particular the Innovation and Technology Commission for their guidance and support during the year. It is also my pleasure to express a warm welcome to three new Board members – Mr. Cheng Cheuk-wing, Professor Ching Pak-chung and Dr. Franklin Tong Fuk-kay. With their wealth of expertise and experience, I have no doubt that, together with their Board peers, they will play an important role in guiding ASTRI to its next level of development.

Dr. Patrick Wang (left) with Miss Elizabeth Tse (centre), Permanent Secretary for Commerce and Economic Development and Miss Janet Wong, Commissioner for Innovation and Technology, at the annual Board Retreat 2011
汪穗中博士（左）與商務及經濟發展局常任秘書長謝曼怡女士（中）及創新科技署署長王榮珍女士於2011年退修會上合照

邱吉爾曾經說過：「改善就是改變；要達至完美，便得經常變更。」為了迎接未來的挑戰，我們不僅歡迎來自董事局的新想法和新觀點，也同樣歡迎應科院的同事和廣大市民對我們提供意見，共同探索未來路向。我們共享願景，全情投入，我有信心應科院下一份年報將會展示因我們努力不懈所獲得的令人興奮的進展和成果。

最後，我衷心感謝特區政府，特別是創新科技署，在過去一年的指導和支持。我也熱烈歡迎三位新任董事─鄭灼榮先生、程伯中教授和湯復基博士。我深信他們以其豐富的專業知識和經驗，將會與其他董事一起合力領導應科院，更上一層樓。

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

Chief Executive Officer's Review
行政總裁回顧

> **Fully aware that talent is our greatest asset and cornerstone for our future successes, ASTRI has been attaching great importance to nurturing the new generation.**
>
> **我們絕對認同人才是應科院的最寶貴資產，是我們賴以開創未來的重要基石，所以我們十分重視培育新一代的科技專才。**

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

The year under review has been undoubtedly another successful one for ASTRI. With shared vision, commitment and dedication from all members at ASTRI, together with tremendous support from industrial partners and the Government, ASTRI continued to fulfil its goals of achieving R&D excellence and delivering its leading-edge technologies to the market.

While our accomplishments and developments during the past year are elaborated in subsequent sections of this report, it is worth noting we were able to increase the number of technology transfers from 75 to 83. Contract Research has remained the most popular form of collaboration with industry in which partners paid all project costs for customized R&D services rendered by ASTRI. Industry Collaborative Projects (ICP), which required contributions of expertise and resources from both ASTRI and its partners, continued to gain momentum. There were four new ICPs signed this year with an aggregated contract value exceeding HK$10 million. We were also able to maintain the same level of industry contribution at HK$60.9 million during the same period.
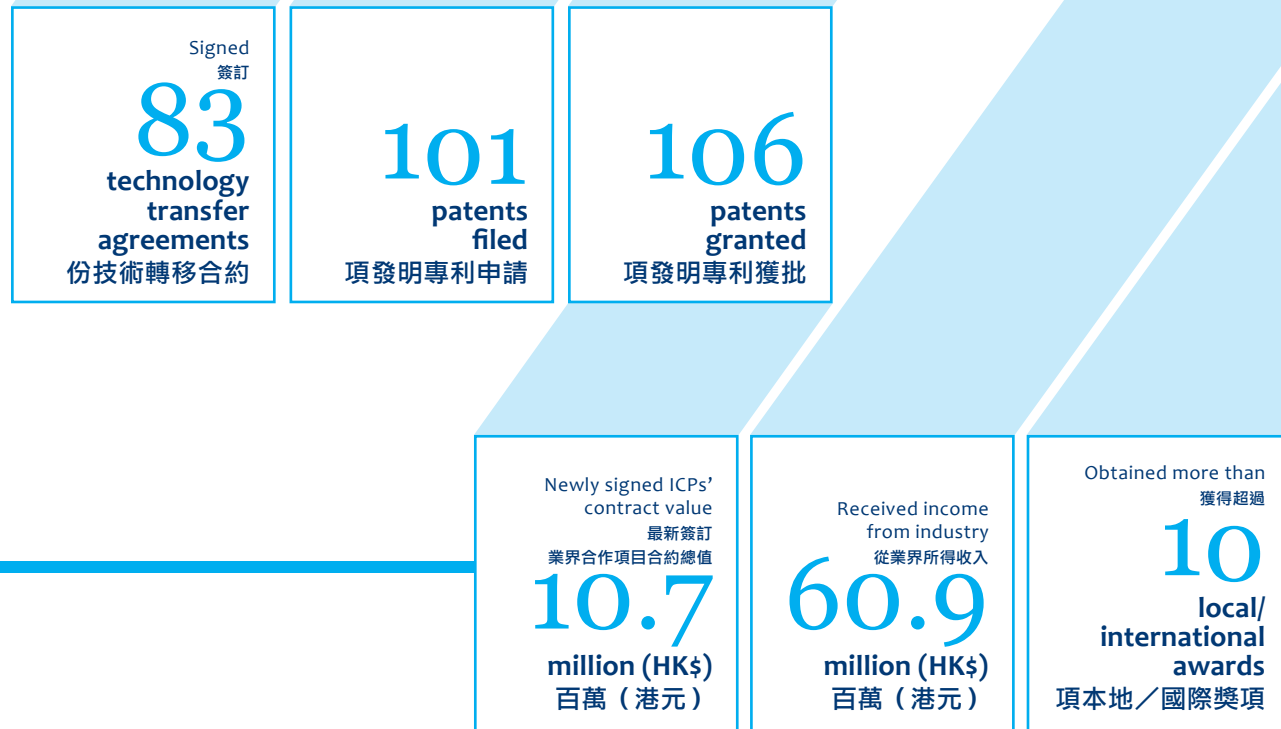
The growing number of new and long-term customers illustrated well industry's confidence in our R&D capabilities. I am optimistic that with the Government's new policy of increasing R&D cash rebate by three-fold, from 10 to 30 per cent, more enterprises will be encouraged to venture into applied R&D with us in the months to come.

在應科院全人上下一心、群策群力、共同為實現目標而努力的情況下，再加上政府和業界夥伴給予的大力支持和鼓勵，本院在剛過去的一個財政年度業績斐然，為市場帶來不少嶄新科技，令本人深感自豪。

本院於去年取得的各項重要成就和發展，在本年報各個章節有詳細闡述。值得告慰的是本院向業界轉移的技術，已由七十五項增加至八十三項。其中由客戶負擔所有研發開支，為客戶度身訂制所需服務的「合約研究」，仍然是最受業界歡迎的合作模式。此外，結合本院和合作夥伴的資源和專業技能的「業界合作項目」，支持度亦繼續增加。年內，本院新簽訂的「業界合作項目」共有四個，累積合約總值超過港幣一千萬元。此外，全年從業界所得收入則維持在港幣六千零九十萬元的水平。

應科院能不斷吸引新客戶，以及與一些業界夥伴維持長期合作關係，實足以証明業界對我們研發能力的信心。本人相信隨著政府增加投資研發回贈金額，由原來的百分之十大幅增加至百分之三十，定會吸引更多企業增加研發投資，與本院合作共同開發應用科技。

Signed
簽訂
83
**technology
transfer
agreements**
份技術轉移合約

101
**patents
filed**
項發明專利申請

106
**patents
granted**
項發明專利獲批

Newly signed ICPs'
contract value
最新簽訂
業界合作項目合約總值
10.7
million (HK$)
百萬（港元）

Received income
from industry
從業界所得收入
60.9
million (HK$)
百萬（港元）

Obtained more than
獲得超過
10
**local/
international
awards**
項本地／國際獎項

ASTRI also continued to do well in enriching its portfolio of home-grown intellectual properties. We received 106 new patents and filed 101 patent applications for new inventions in the United States and other countries.

Looking beyond the confines of ASTRI, I am happy to report that we were successful in helping clients further develop their businesses. One such example concerned our long-term partner, MiniLogic Device Corporation, which was listed on the Growth Enterprise Market (GEM) Board of Hong Kong Stock Exchange in January 2012. The company has been using ASTRI IPs and know-how to develop IC products since its establishment, and our contributions were acknowledged in its Prospectus.

Another customer, PicoChip, was acquired by Mindspeed Technologies Inc., a market leader in network infrastructure in the U.S. This strategic acquisition will enhance Mindspeed's leadership position in small cell wireless technologies for mobile broadband communication. The close partnership between ASTRI and PicoChip has come a long way since 2008 and many breakthrough developments in LTE Femtocell were achieved as a result of our joint efforts.

此外，本院在創造知識產權方面也有驕人成果。年內，本院的創新發明共獲得一百零六項新專利，我們又在美國和其他國家合共申請了一百零一項發明專利。

雖然應科院的工作並未包括為客戶推廣業務，但我們的努力往往帶來出人意表的效果。本人很高興與大家分享兩個實例。第一個是本院的長期合作夥伴微創高科有限公司，於二零一二年一月在香港聯合交易所的創業板上市時，在其招股書中詳細陳述自該公司成立以來，一直獲應科院授權使用知識產權和專有技術開發集成電路產品，使其業務發展一日千里，奠定了成立上市公司的根基。

另一個長期客戶PicoChip，獲得美國在網絡建構方面的龍頭企業敏迅科技作策略性收購，敏迅因此可確立其在移動寬頻通訊小蜂窩無線技術的領導地位。應科院與PicoChip早於二零零八年起便一直合作無間，在LTE家用小基站技術上曾攜手取得多項突破性的發展。

Dr. Cheung (second
from left) addresses the
audience of the "Think
Asia, Think Hong Kong"
Symposium in London
張博士（左二）於倫敦「邁向
亞洲，首選香港」論壇上發言

Apart from industry, ASTRI is always mindful of its responsibility towards serving the community. Hence, we are very keen on introducing our new technologies to people in Hong Kong. The "Promotion of Innovation and Technology in the Public Sector" programme initiated by the Innovation and Technology Commission (ITC) offers ASTRI an excellent platform to test new technologies with potential users in real life environment. With support from ITC and other government departments and organizations, ASTRI embarked on no fewer than a dozen public sector projects during the year.

For instance, ASTRI proactively responded to the Education Bureau's e-Learning pilot programme by offering many primary schools the ASTRI-developed PAL (Personal Assistant for e-Learning) to encourage e-reading. Working with the Highways Department, we installed our energy-saving LED street lamps in public areas for testing. The Hong Kong Police Force used our intelligent mobile surveillance system in field trials. Moreover, we are also working with the Government on a water seepage detection system for buildings. We hope these innovative technologies will enhance service quality and efficiency in the public sector and eventually benefit the general public.

除了關注業界需要，應科院亦不忘服務社會。由創新科技署牽頭推動的「在公共部門推廣創新科技應用」計劃，正好提供一個理想平台，讓用戶可以在現實生活環境中試用新技術。在創新科技署及其他政府部門及機構的配合下，本院正進行多項技術測試項目。

例如我們積極響應教育局的電子學習試驗計劃，將本院開發的「易學夥伴」平板電腦提供予多間小學試用，以鼓勵電子閱讀；應科院又與路政署合作，將我們的環保省電LED路燈安裝在公眾地方測試；香港警務處也曾實地試驗本院的智能手機監控系統；還有本院正與政府合作研究大廈滲水檢測系統等等。我們期望這些創新科技能進一步提高公用服務的質素和效率，最終造福廣大市民。

另一方面，應科院亦積極推廣以創新科技提升優質生活。在創新科技署舉辦的「創新科技嘉年華2011」，本院以數碼家居為主題向公眾展示了多項新科技，吸引成千上萬市民到場參觀。展會期間我們又為一批小學生舉行了一場別開生面的數碼遊蹤比賽，讓他們可以利用應科院的「易學夥伴」，體驗移動學習的樂趣。應科院在二零一二年又與香港理工大學攜手，參予建設香港房屋協會轄下的長者「智型居」，於住宅示範單位內安裝本院開發的一系列電子醫療儀器，供訪客免費試用。應科院將繼續參與這類與眾同歡的活動，藉此提高市民對創新及科技的興趣。

ASTRI was also active in promoting innovative technologies for quality living. At the InnoCarnival hosted by ITC in 2011, we showcased our new technologies in a digital home environment and attracted thousands of visitors. A Digital Travel Competition was also organized during the carnival, allowing primary school pupils to share the fun of mobile e-learning by using ASTRI's e-reader PAL. In 2012, ASTRI joined hands with Hong Kong Polytechnic University to take part in a project initiated by Hong Kong Housing Society to set up iHome for the elderly. Our e-health devices were installed in a model flat for free trials by visitors. ASTRI will continue engaging the public in such activities to cultivate people's interest in innovation and technology.

Meanwhile, ASTRI constantly brings surprises to industry with its inventions. Both the Real-time 2D-3D Video Conversion Platform and 3D Mini-projector fascinated the market when they were launched. I was delighted to see both technologies win top honours in the Hong Kong ICT Awards 2012, with 2D-3D Conversion winning Grand Award as well as Gold Award, and 3D Mini-projector winning Gold Award, all in the Best Lifestyle category. ASTRI was the big winner in the competition sweeping six awards with different technologies.

Among the array of awards ASTRI received last year, it is worth mentioning that our R&D leaders, Dr. Wang Keh-chung and Dr. Wu Enboa, were conferred the title of Fellow by the Institute of Electrical and Electronics Engineers (IEEE) for their outstanding accomplishments in their respective fields. I am convinced these accolades and awards will motivate the ASTRI community to strive for excellence in our future endeavours and make further contributions to enhance technology.

Fully aware that talent is our greatest asset and cornerstone for our future successes, ASTRI has been attaching great importance to nurturing the new generation. Besides using traditional channels such as career talks, exhibitions and open days to attract young graduates to enter the R&D profession, we also organized internship programmes which have been resoundingly successful. Last year, we employed more than 20 university graduates under the ITC-sponsored internship programme. Since the programme was launched in 2009, nearly 100 graduates have worked at ASTRI as interns.

↑ Dr. Cheung (left) represents ASTRI to kickoff e-Reading Trial Programme in primary and secondary schools
張博士（左）代表應科院，主持「電子閱讀試驗計劃」啟動禮，為中小學校提供試讀

應科院憑著源源創意，持續為業界帶來驚喜。年內我們推出二維至三維視頻實時轉換及三維微型投影機技術，在市場上曾引起熱烈回響。此兩項技術其後在「香港資訊及通訊科技獎2012」中屢獲殊榮，前者囊括「最佳生活時尚獎」大獎及金獎，後者則獲得金獎。應科院在不同技術界別共獲六個獎項，是該次比賽的大贏家。

此外，本院的兩位研發領導王克中博士及吳恩柏博士，去年分別獲國際電機電子工程師學會頒授院士榮銜，以表揚他們在各自研究領域上的卓越成就。本人相信上述的榮譽和嘉許對應科院團隊都會產生激勵作用，令我們更有信心為推動科技前進作出貢獻。

我們絕對認同人才是應科院的最寶貴資產，是我們賴以開創未來的重要基石，所以我們十分重視培育新一代的科技專才。除了透過傳統渠道，包括舉辦就業講座、展覽和開放日招攬新秀，本院並為有志之士舉辦實習研究員計劃，反應非常踴躍。去年經由應科院招募參加創新科技署資助的實習研究員計劃的大學畢業生超過二十人。自計劃於二零零八年推出至今，透過此計劃在應科院實習的畢業生接近一百人。

ASTRI joins hands with
Hong Kong PolyU and
Hong Kong Housing
Society to set up iHome
for the elderly. On the
left is Dr. Cheung at the
launching ceremony
應科院與香港理工大學及
香港房屋協會合作
建設長者「智型居」，
圖為張博士（左）主持開展禮

Dr. Cheung (left)
introduces new
technologies to
legislative councillors
during their visit to ASTRI
立法會議員到訪應科院，
張博士（左）向他們介紹
本院的最新技術

ASTRI also recruited 28 summer interns last year, which included students from prestigious overseas universities such as Princeton, Massachusetts Institute of Technology (MIT) and University of California at Los Angeles (UCLA). The summer internship provides good opportunities for students to gain practical R&D experience in the actual environment. ASTRI will continue nurturing R&D professionals, hence strengthening Hong Kong's competitiveness in R&D development.

With Innovation and Technology identified as one of the six priority industries, ASTRI is determined to work hand-in-hand with the Government in helping Hong Kong tap opportunities and realize its full potentials in technology development. We will increase focus on understanding market needs and commercializing our technologies. In this connection, a new Marketing and Commercialization Department was set up to further facilitate collaborations and partnerships among governments, industries, academia and research institutions.

With shared commitment in connecting the best of our people, expertise and explosive creativity, we are fully prepared to embark on a new and exciting journey that will lead us to help build a better and more prosperous Hong Kong in the years ahead.

應科院去年招收了共二十八名暑期實習研究員，其中包括來自普林斯頓大學、麻省理工學院和加州大學洛杉磯分校等著名學府的學生。他們在本院接受暑期培訓，在真實環境中實踐科研和吸收寶貴經驗。應科院會繼續以培訓科技專才為己任，以加強香港發展科技的競爭力。

本院亦將秉承創新及科技是香港六大優勢產業之一的政策，繼續與政府衷誠合作，為香港未來科技發展開拓新機遇，進一步尋求科技突破。我們會加深了解市場需要，加強科技商品化的力度。為達到此目標，我們已成立市場及商務部，專責推動官、產、學、研之間的聯繫和合作。

應科院結合了優秀人才、專業技能和無窮創造力，今後將會繼往開來，全力以赴，開闢科技新天地，矢志建設一個更美好和更繁榮的香港。

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

Connecting through Collaborations

官產學研　推動產業化

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，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.
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 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 in all target areas. The number of technology transfers, after a slight drop last year, resumed an upward trend while income from industry maintained the same high level.

年度內應科院在各個工作目標均取得令人滿意的成績。技術轉移的數量在去年曾略有下降，今年已恢復上升趨勢，從業界所得收入則與去年相若。

ASTRI's Four Main Types of Projects 應科院的研發項目主要分四大類

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

2
ITF[1]-funded platform projects
創新及科技基金資助平台項目

4
Contract research projects - customized R&D projects in accordance with 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

3
Industry Collaborative Projects (ICP) - 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

Technology Transfers

The **number of technology transfers to industry** was 83 in 2011/12. The breakdown by R&D groups for the past three years is:

技術轉移

二零一一／一二年應科院向業界轉移的技術數量共八十三項。各研發群組過去三年**向業界轉移的技術數量**表列如下：

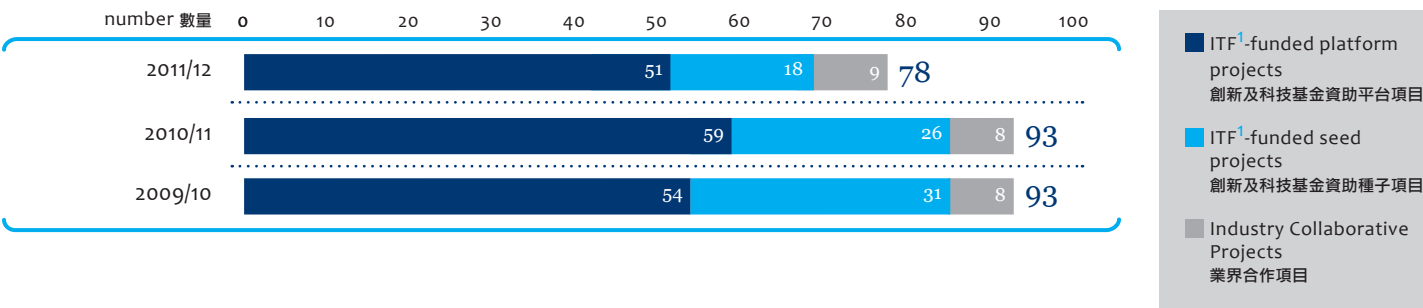| R&D Group	研發群組	2011/12	2010/11	2009/10
● Communications Technologies	通訊技術	18	18	34
● Enterprise & Consumer Electronics	企業與消費電子	17	18	19
● IC Design	集成電路設計	18	11	7
● Material & Packaging Technologies	材料與構裝技術	26	28	40
● Bio-Medical Electronics (Team)	生物醫學電子（組）	1	0	0
● Exploratory Research Laboratory (Team)	信息研究室（組）	3	N.A. / 不適用	N.A. / 不適用
Total	**總數**	**83**	**75**	**100**

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

下表列出過去三年通過**各種途徑向業界轉移技術的數目**：

Channel	途徑	2011/12	2010/11	2009/10
Industry Collaborative Project agreements signed	已簽訂的業界合作項目合約	4	2	1
Contract research project agreements signed	已簽訂的合約研究項目合約	51	41	69
Licensing agreements signed	已簽訂的授權協議	28	32	30
Total	**總數**	**83**	**75**	**100**

The following table shows the number of **three of the four major types of projects undertaken** by ASTRI in the past three years.
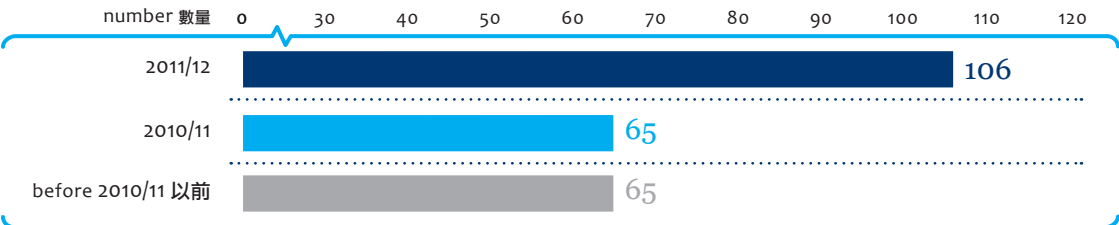
下表展示過去三年應科院**進行的四類主要研發項目其中三類**的數量。

number 數量

2011/12	51 / 18 / 9	78
2010/11	59 / 26 / 8	93
2009/10	54 / 31 / 8	93

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

■ ITF[1]-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

106
patents granted
項發明專利獲批

101
patents filed
項發明專利申請

Patents

As at 31 March, 2012, ASTRI was granted 236 patents for technologies developed. As shown in the following table, the **number of patents granted** continued to grow year after year.

專利

截至二零一二年三月三十一日止，應科院所研發的技術共取得二百三十六項專利。下表展示應科院過去**獲發的專利數目**續年上升：

number 數量	0	30	40	50	60	70	80	90	100	110	120
2011/12										106	
2010/11				65							
before 2010/11 以前					65						

A total of 101 patent applications were filed on the Mainland, U.S. and other countries in 2011/12. From 2006/07 to 2011/12, ASTRI filed more than 600 patent applications for inventions. The following table shows the **number of applications filed** by R&D groups in the past three years:

在二零一一／一二年，應科院在中國內地、美國及其他國家共作出一百零一項專利申請。從二零零六／零七年至二零一一／一二年間，應科院已為新發明申請超過六百項專利。下表列出過去三年各研發群組**申請的專利數目**：

R&D Group	研發群組	2011/12	2010/11	2009/10
● Communications Technologies	通訊技術	12	7	14
● Enterprise & Consumer Electronics	企業與消費電子	8	16	26
● IC Design	集成電路設計	18	10	12
● Material & Packaging Technologies	材料與構裝技術	62	52	66
● Bio-Medical Electronics (Team)	生物醫學電子（組）	0	2	4
● Exploratory Research Laboratory (Team)	信息研究室（組）	0	N.A. / 不適用	N.A. / 不適用
Non-R&D Department	非研發部門	1	1	0
Total	**總數**	**101**	**88**	**122**

Successful Commercialization
應科院技術成功市場化

In 2011/12 ASTRI signed 83 agreements for technology transfers to industry through licensing, contract research and other means, resulting in many commercialization cases. The following are some highlights:

在二零一一／一二年，應科院藉技術授權、合約研究及其他途徑作出了八十三項技術轉移，成功市場化的個案很多，以下是重要例子：

4G LTE 第四代移動通訊LTE技術

With 4G becoming a trend in mobile communication, ASTRI developed the first commercial-grade LTE small cell reference design. It was first demonstrated to the public during Mobile World Congress 2012. The technology was licensed to a Nasdaq-listed company, which is a leader in small cell wireless technologies for mobile broadband communication.

隨著第四代移動通訊漸趨普及，應科院已開發出首個商用級LTE小蜂窩基站參考設計，並且在2012年全球移動通訊大會上首次向業界展示該技術。應科院已將技術授權予一家在移動寬頻通訊小蜂窩無線技術方面具領導地位，並在納斯達克上市的公司。

Income from Industry

During the year, income from industry received[1] for all projects amounted to HK$60.9 million, with the level of contribution[2] at 20.2 per cent. The table below shows income from industry received in the past three years.
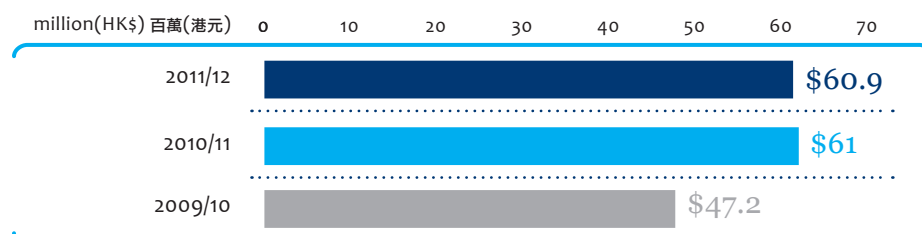
業界收入

是年度，從所有項目已收取的業界收入[1]總額為六千零九十萬港元，業界投入資金水平[2]為百分之二十點二。下表顯示過去三年業界收入的情況。

[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分比

million(HK$) 百萬(港元)

| | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 |

- 2011/12 $60.9
- 2010/11 $61
- 2009/10 $47.2

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。

Received income from industry
從業界所得收入
60.9
million (HK$)
百萬（港元）

R&D Group	研發群組	2011/12 (HK$M)	2010/11 (HK$M)	2009/10 (HK$M)
● Communications Technologies	通訊技術	17.6	20	13.9
● Enterprise & Consumer Electronics	企業與消費電子	12.7	15.9	11.9
● IC Design	集成電路設計	10.3	10.6	8.8
● Material & Packaging Technologies	材料與構裝技術	19.5	14.7	10.2
● Bio-Medical Electronics (Team)	生物醫學電子（組）	0.8	(0.2)	2.4
● Exploratory Research Laboratory (Team)	信息研究室（組）	N.A. / 不適用	N.A. / 不適用	N.A. / 不適用
Total	**總數**	**60.9**	**61**	**47.2**

**2D-3D Real-time Conversion Platform
二維至三維實時轉換平台**

The technology can instantly convert 2D images from multiple sources into natural 3D images. It was licensed to a U.S. partner for embedding into a conversion box, which is now available in the U.S and European markets.

此技術可以即時將不同來源的二維視頻影像轉換成三維影像，效果自然逼真。該技術已授權予一家在美國的合作夥伴，用來生產轉換器，該產品現正於歐美市場發售。

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Use of Technologies in Public Sector

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 with various government agencies to introduce ASTRI technologies to people, allowing them to experience the benefits of using new technologies in real-life situations. The following are some of the projects:

在公共部門應用新科技

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：

e-Learning

To help teachers and students prepare for an e-learning environment advocated by the Education Bureau, ASTRI launched an e-reading trial programme in 68 schools providing students with its e-readers installed in MyID and PAL (Personal Assistant for e-Learning). ASTRI also engaged 19 schools in the trial use of its e-learning solution under various programmes sponsored by the bureau.

電子學習

為幫助教師和學生適應教育局提倡的電子學習環境，應科院推出電子閱讀試驗計劃，為六十八間學校的學生提供本院安裝於「myID」和「易學夥伴」的電子閱讀器。應科院並參與教育局資助的其他計劃，為十九間學校提供電子學習方案試用。

e-Health

ASTRI supported the Hong Kong Housing Society's iHome project. Its Reflective Pulse Oximetry Dongle and Tele-health Hub System were installed in a demo-flat for trial use by the elderly. ASTRI also conducted a successful trial of the Tele-health Hub System for out-patients in a public hospital.

電子醫療

應科院支持香港房屋協會的「智型居」計劃。在專為長者而設的示範單位內安裝由本院研發的反射式脈搏血氧測量儀及遠程醫療系統，給長者試用。應科院又與一間公立醫院合作，為遠程醫療系統成功進行了測試。

LED Lighting

ASTRI provided LED corridor lamps to two Housing Department public estates. We also collaborated with the Highways Department, Hong Kong Science and Technology Parks Corporation and the Hong Kong University of Science and Technology in installing LED street lamps and LED MR16 lamps at several public locations for trial use.

LED照明

應科院在房屋署轄下兩個公共屋邨安裝LED走廊燈。此外又與路政署、香港科技園公司及香港科技大學合作，在幾處公共地方安裝LED路燈及LED MR16 射燈。

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3D Dual-LCoS Mini-projector　3D雙LCoS微型投影機

ASTRI developed the world's first 3D dual-LCoS mini-projector in collaboration with Solomon Systech and other industry leaders. A HK$2 million technology licensing agreement was signed with a top LCoS system solution supplier on the Mainland to mass produce the solution.

應科院夥拍晶門科技有限公司及其他業界領先企業開發出全球首部3D雙LCoS微型投影機。本院與內地一家頂尖的LCoS晶片及投影系統廠商已簽署了一份價值二百萬港元的技術授權合約，預備將此技術投產。

Advanced Detection of Water Seepage

A proposal on water seepage detection was presented to the Development Bureau, Buildings Department and the Food and Environmental Hygiene Department. The proposal to carry out the project received positive feedback.

先進的檢測滲水系統

應科院已分別向發展局、屋宇署及食物環境衛生署提交了檢測滲水系統建議書，並獲得正面評價。

Belisha Beacon Lamps

Two Belisha beacon lamps with energy-saving LED bulbs developed by ASTRI were erected at the zebra crossing outside MTR University Station for testing by the Transportation Department. Preliminary results showed the LED lamps saved up to 90 per cent energy compared with conventional light bulbs.

LED交通指示燈柱

兩支使用了應科院LED燈泡的交通指示燈柱，已獲運輸署安排安裝在港鐵大學站外的斑馬線進行測試。初步測試結果顯示，應科院LED燈泡比普通的燈泡節省高達百分之九十的能源。

Intelligent Mobile Surveillance Technology Platform

The Hong Kong Police Force has been conducting field tests of the above technology which can quickly identify suspects across multiple camera networks. It can also compare captured faces with database images.

智能移動監控技術平台

香港警務處就該技術進行了實地測試，此平台技術可以讓用戶通過多個攝像網絡來快速追蹤目標，還可以將可疑人物的樣貌與數據庫的資料相對照。

High-speed Digital Pathology System

ASTRI has been working closely with pathology departments in several public hospitals in Hong Kong to test the system.

高速病理切片數碼化系統

應科院與本地幾家公立醫院的病理部門合作測試該系統。

Service Quality Data Analytics System

The Complaints Against Police Office used the system on a trail basis to analyse huge amount of data related to the public's complaints against police officers gathered in the past 20 years.

服務品質數據分析技術

此技術已獲香港警務處的投訴及內部調查科試用，來分析過去二十年來公眾對警務人員投訴的大量資料。

LED Lighting LED照明

Birdcage technology with excellent heat ventilation design was licensed to three LED lighting companies on the Mainland to produce their own MR16 brands and other spot lighting luminaries. LED spot lamps are sold in more than 400 shops worldwide by ASTRI's licensees.

「鳥籠」熱能管理技術具備超卓的散熱功能，目前內地已有三家LED大企業獲授權使用該技術生產自家品牌的MR16射燈和其他LED射燈燈具。利用本院技術生產的LED射燈已在全球四百多家商店銷售。

No. of visits organized
接待探訪次數

80+

No. of visitors received
接待訪客人數

1,300+

No. of seminars
organized
舉辦研討會次數

30+

No. of participants in
ASTRI seminars
參加應科院研討會人數

2,000+

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

70+

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. On the other hand, ASTRI also actively supported or participated in activities organized by other companies or organizations so as to maintain good connection with industry and people.

Awards and Accolades

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

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，讓來自不同界別人士認識應科院及本地研發科技。另一方面，應科院積極支持和參予其他公司及機構所舉辦的活動，務求與業界和大眾保持緊密聯繫。

獎項與榮譽

應科院及其合作顆伴於是年內獲頒多個重要獎項與榮譽，充分顯示出應科院的研發能力和員工的成就，得到海內外業界的認同。

Dr. Wang Keh-chung, Vice President and Group Director of IC Design Group, and Dr. Wu Enboa, Vice President and Group Director of Material & Packaging Technologies Group, were conferred the title of Fellow by the Institute of Electrical and Electronics Engineers (IEEE).	本院集成電路設計群組副總裁及研發群組總監王克中博士，及材料與構裝技術群組副總裁及研發群組總監吳恩柏博士，獲國際電機電子工程師學會頒授院士榮銜。
Real-time 2D-3D Conversion Platform won the Grand Award, Best Lifestyle as well as Gold Award, Best Lifestyle (Social, Communications & Media) in the Hong Kong ICT Awards 2012.	二維至三維實時轉換平台在二零一二年香港資訊及通訊科技獎中榮獲最佳生活時尚獎大獎，及最佳生活時尚獎（社交‧傳訊‧媒體）金獎。
ASTRI and partner Solomon Systech developed the 3D Dual-LCoS Mini-projector which won Gold Award, Best Lifestyle (Green, Healthy & Creative Living) in the Hong Kong ICT Awards 2012.	應科院與晶門科技有限公司合作研發的3D雙LCoS微型投影機，榮獲二零一二年香港資訊及通訊科技獎最佳生活時尚獎（綠色‧健康‧創意）金獎。
ASTRI's partner Tech-Trans won Silver Award, Best Green (Adoption-SMEs) in the Hong Kong ICT Awards 2012 with Hybrid Mode Real-time Locationing System using LEDs with technology licensed from ASTRI.*	應科院與Tech-Trans合作研發的混合式LED實時定位系統，在二零一二年香港資訊及通訊科技獎中獲得最佳綠色科技獎銀獎（應用一中小企）。*

Solid State Driver and USB 3.0 固態硬盤及USB 3.0
An ICP with Velosti of Silicon Valley resulted in mass production of USB 3.0 application processors. Five agreements were also signed with SiliconGo Microelectronics Co. Ltd. and other customers to leverage ASTRI's SSD controller SoC and Super-speed USB 3.0 technologies for developing new products.
應科院與來自美國矽谷的Velosti簽訂了「業界合作項目」，合作研發出USB 3.0應用處理器並已投產。應科院又與硅格半導體有限公司及其他幾家公司簽訂了五份合約，他們將借助本院在固態硬盤控制器晶片及超高速USB 3.0技術開發新產品。

Interactive Touch Frame won Bronze Award, Best Lifestyle (Learning & Living) in the Hong Kong ICT Awards 2012.	I-T Frame互動觸控框在二零一二年香港資訊及通訊科技獎中獲得最佳生活時尚獎（學習・生活）銅獎。
Tyre Pressure Monitoring System won Bronze Award, Best Green (Innovation) in the Hong Kong ICT Awards 2012.	輪胎監察系統在二零一二年香港資訊及通訊科技獎中獲得最佳綠色科技獎（創新）銅獎。
An ASTRI R&D team joined an IEEE Quality IP P1734 Working Group in 2009 to help standardize IP qualification to IEEE standard. P1734 was approved by the IEEE Standards Association in 2011. The team received a "Certification of Appreciation" for their outstanding contributions to the development of this new standard.	應科院一隊研發團隊於二零零九年加入IEEE IP質量P1734工作組，致力推動IP質量驗證標準化。P1734於二零一一年正式成為IEEE標準。研發團隊獲IEEE頒發「銘謝狀」，以表彰其在新標準制定過程中所作的貢獻。
ASTRI, partnering with Guangdong Yuejing High Technology Company, won an Outstanding Paper Award with the paper "Challenges in Developing Cost-effective System-in-Package for Tyre Pressure Monitoring System" at the 12th International Conference on Electronic Packaging Technology and High-density Packaging 2011 held in Shanghai.	應科院夥拍廣東省粵晶高科公司，參加第十二屆電子封裝國際會議及高密度封裝國際會議，並發表題為「開發具成本效益的輪胎壓力監測系統級構裝所面對的挑戰」的文章而獲得最佳論文獎。
A research paper on "Metal-based Anode Materials for Lithium Ion Battery" was presented the Certificate of Excellent Paper at the International Conference on Chemistry and Chemical Engineering 2011 held in Chengdu.	應科院於二零一一年化學與化學工程國際會議上發表有關先進鋰離子電池陽極材料的研究，因而獲優秀論文證書。
ASTRI Annual Report (2010/11) with the title "Sparks of Innovations" won two honours in an international annual report competition organized by the League of American Communications Professionals. The honours are LACP Vision Awards: Platinum Award in the Technology, Semiconductor and Equipment category, and Gold Award in the Telecommunications category.	應科院以「創意之源」為題的二零一零／一一年年報，在國際年報比賽LACP Vision Awards中榮獲兩個重要獎項：分別是科技・半導體・器材組鉑金獎，以及電訊組金獎。是項比賽由美國League of American Communications Professionals舉辦。

High-speed Digital Pathology System
高速病理切片數碼化系統
ASTRI signed a technology licensing agreement with a major Hong Kong opto-medical equipment company with manufacturing facilities on the Mainland to develop the High-speed Digital Pathology System. The project aims at speeding up the glass slide digitalization process and producing high quality digital images.
應科院與香港一家主要的光電醫療設備公司簽署了技術授權合約，該客戶將透過其位於內地的生產設施，開發高速數碼病理系統設備，以加快病理切片數碼化過程，並提供高質量的數碼圖像。

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Corporate Governance
企業管治

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, ASTRI's 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 sectors.

董事局是應科院的管治組織,董事局成員包括來自工商界、學術界及香港特區政府的代表。董事都是由特區政府委任,負責制訂應科院的發展政策和路向。

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改變作出靈活應變,並以配合工業界需要為主要工作目標。
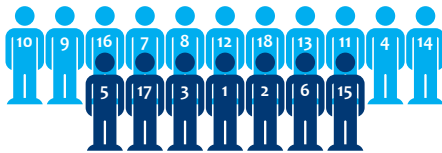
As at 31 March, 2012
截至二零一二年三月三十一日

In alphabetical order
of surnames
以英文姓氏順序排列

Chairman 主席

Dr. Patrick Wang Shui-chung, SBS, JP [1]
Chairman and Chief Executive Officer, Johnson Electric Holdings Ltd.
汪穗中博士,SBS,JP
德昌電機控股有限公司主席及行政總裁

Official Members 官守董事

Miss Elizabeth Tse Man-yee, JP [2]
Permanent Secretary for Commerce and Economic Development (Communications and Technology)
謝曼怡女士,JP
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]
Commissioner for Innovation and Technology
王榮珍女士,JP
創新科技署署長

Members 董事

Mr. Anthony Au Wai-hung, BBS [4]
Director, Futuresuccess Consultants Ltd.
區煒洪先生，BBS
Futuresuccess Consultants Ltd. 董事

Dr. Sunny Chai Ngai-chiu [5]
Managing Director, Fook Tin Technologies Ltd.
查毅超博士
福田科技有限公司董事總經理

Prof. Andrew Chan Chi-fai, SBS, JP
Director, Executive MBA Programme and
Professor, Department of Marketing,
The Chinese University of Hong Kong
陳志輝教授，SBS，JP
香港中文大學行政人員工商管理碩士課程主任及
市場學系教授

Prof. Philip Chan Ching-ho [6]
Deputy President and Provost,
The Hong Kong Polytechnic University
陳正豪教授
香港理工大學常務及學務副校長

Mr. Cheng Cheuk-wing [7]
CEO and President, Appotech Ltd.
鄭灼榮先生
卓榮集成電路科技有限公司總裁

Prof. Chew Weng-cho [8]
Chair Professor, Department of Electrical
and Electronic Engineering,
The University of Hong Kong
周永祖教授
香港大學工程學院電機電子工程系講座教授

Prof. Ching Pak-chung, BBS [9]
Pro-Vice Chancellor/Vice President,
The Chinese University of Hong Kong
程伯中教授，BBS
香港中文大學副校長

Mr. George Hongchoy Kwok-lung
Executive Director and Chief Executive Officer,
The Link Management Ltd.
王國龍先生
領匯管理有限公司執行董事兼行政總裁

Dr. Patrick Lam See-pong [10]
林師龐博士

Mr. Henry Leung Kwong-han [11]
Chief Operating Officer and Executive Director,
GP Batteries International Ltd.
梁廣恆先生
金山電池國際有限公司營運總裁及執行董事

Dr. Humphrey Leung Kwong-wai [12]
Group CEO, Solomon Systech Ltd.
梁廣偉博士
晶門科技有限公司集團行政總裁

Ms. Agnes Nardi Kar-wai [13]
Chief Executive Officer,
Business Environment Council Ltd.
李家慧女士
商界環保協會有限公司行政總裁

Mr. Victor Ng Kwok-ho [14]
Managing Director, Micom Tech Ltd.
吳國豪先生
捷訊電腦科技有限公司董事總經理

Mr. Richard Sun Po-yuen, JP [15]
Partner, PricewaterhouseCoopers
孫寶源先生，JP
羅兵咸永道會計師事務所合夥人

Dr. Franklin Tong Fuk-kay [16]
Vice President, Optical Component Unit,
SAE Magnetics (H.K.) Ltd.
湯復基博士
新科實業有限公司副總裁

Mr. Peter Wong King-fai [17]
Chief Executive Officer,
Hutchison Global Communications Ltd.
黃景輝先生
和記環球電訊有限公司行政總裁

Mr. Luther Wong Lok-tak [18]
Managing Director, C&G Environmental
Technology Ltd.
王樂得先生
思捷環保科技有限公司行政總裁

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

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

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:

功能委員會成員

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：

Finance and Administration Committee
財務與行政委員會

- Mr. Henry Leung Kwong-han (Chairman)
  梁廣恆先生 (主席)
- Mr. Anthony Au Wai-hung, BBS
  區煒洪先生，BBS
- Mr. Cheng Cheuk-wing
  鄭灼榮先生
- Ms. Agnes Nardi Kar-wai
  李家慧女士
- Dr. Franklin Tong Fuk-kay
  湯復基博士
- Mr. Luther Wong Lok-tak
  王樂得先生
- Miss Janet Wong Wing-chen, JP
  王榮珍女士，JP

Technology Committee
科技委員會

- Prof. Philip Chan Ching-ho (Chairman)
  陳正豪教授（主席）
- Mr. Anthony Au Wai-hung, BBS
  區煒洪先生，BBS
- Dr. Sunny Chai Ngai-chiu
  查毅超博士
- Mr. Cheng Cheuk-wing
  鄭灼榮先生
- Prof. Chew Weng-cho
  周永祖教授
- Prof. Ching Pak-chung, BBS
  程伯中教授，BBS
- Dr. Patrick Lam See-pong
  林師龐博士
- Mr. Henry Leung Kwong-han
  梁廣恆先生
- Dr. Humphrey Leung Kwong-wai
  梁廣偉博士
- 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. Peter Wong King-fai
  黃景輝先生
- Miss Janet Wong Wing-chen, JP
  王榮珍女士，JP

Audit Committee
審計委員會

- Mr. Richard Sun Po-yuen, JP (Chairman)
  孫寶源先生，JP（主席）
- Dr. Sunny Chai Ngai-chiu
  查毅超博士
- 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

Meetings and Attendance

The Board and the Functional Committees convene meetings on a regular basis. Special meetings will be held as and when necessary.

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。

Board Meetings 董事局會議	06.04.2011	29.06.2011	01.09.2011*	07.10.2011	19.12.2011	28.03.2012
Total no. of directors during the period 期內董事局成員人數	17	17	17	17	17	20
Total no. of directors present at meeting 董事出席人數	15	13	12	9	15	17
Total no. of apologies 缺席人數	2	4	5	8	2	3
Group attendance in percentage 出席率	88%	76%	71%	53%	88%	85%

*Special Board Meeting 特別董事局會議

TC Meetings 科技委員會會議	16.06.2011	20.09.2011	06.12.2011	13.03.2012
Total no. of directors during the period 期內委員會成員人數	11	11	11	14
Total no. of directors present at meeting 董事出席人數	11	9	8	10
Total no. of apologies 缺席人數	0	2	3	4
Group attendance in percentage 出席率	100%	82%	73%	71%

FAC Meetings 財務與行政委員會會議	02.06.2011	01.09.2011	24.11.2011	01.03.2012
Total no. of directors during the period 期內委員會成員人數	5	5	5	7
Total no. of directors present at meeting 董事出席人數	4	5	4	7
Total no. of apologies 缺席人數	1	0	1	0
Group attendance in percentage 出席率	80%	100%	80%	100%

AC Meetings 審計委員會會議	14.06.2011	14.09.2011	06.12.2011	09.03.2012
Total no. of directors during the period 期內委員會成員人數	5	5	5	6
Total no. of directors present at meeting 董事出席人數	3	5	4	4
Total no. of apologies 缺席人數	2	0	1	2
Group attendance in percentage 出席率	60%	100%	80%	67%

Movements of Directors

Three distinguished new members from the academia and industry sectors were appointed to the Board in March 2012. Their directorship covers a two-year period until 28 February, 2014.

董事局成員變動

三位分別來自業界和學術界的才俊於二零一二年三月獲委任為新董事，任期為兩年，直至二零一四年二月廿八日。

New Directors 新委任董事	Appointed Date 委任日期
Mr. Cheng Cheuk-wing 鄭灼榮先生	1 March, 2012 二零一二年三月一日
Prof. Ching Pak-chung, BBS 程伯中教授，BBS	1 March, 2012 二零一二年三月一日
Dr. Franklin Tong Fuk-kay 湯復基博士	1 March, 2012 二零一二年三月一日

Corporate Governance Manual

To achieve good governance, a Corporate Governance Manual clearly stating ASTRI's policies and principles in governance was compiled and approved by the Board to facilitate the Directors 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 2007 to assist the Board by providing it with information and assurance on internal management controls.

企業管治手冊

為達到優良的企業管治，應科院已制定經董事局核准的企業管治手冊，列明應科院的管治政策和原則，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被更新，把對改善應科院運作模式所必要的轉變和發展涵蓋於手冊之內，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，員工保持最高的道德操守，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；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，應科院於二零零七年成立內部審計部門，隸屬於審計委員會，協助董事局，向其提供有關內部管理控制的資訊及保證。

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 are to be presented to the Audit Committee.

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

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

Planning and Monitoring

Under the theme "customer-focused R&D", ASTRI operations aim 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 researchers and management processes. To assure the quality of its R&D programmes, ASTRI conducts an Annual Planning Cycle comprising the following steps:

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

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

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

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 to 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.

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 outputs. A report on the commercialization status of all pending and granted patents is submitted to the Technology Committee every six months.

Target Setting, Risk Management and Control

During the year under review, the Board adopted new measures to further upgrade ASTRI's 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, the 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 the risks. A Preliminary Risk Register was formulated and an annual update will be conducted to further enhance effective governance of ASTRI.

Quality Management System

ASTRI obtained certification compliant to ISO 9001:2008 standard a few years ago. We are renewing our efforts to pursue further in 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 aiming at increasing customer satisfaction and work efficiency. The five stages for achieving ISO 9001 certification and key success factors were identified:

此四步程序也用於查核和持續監控所有正進行的研發項目，這些項目均由應科院董事局於項目開始後六至九個月內審核，以評估其獲取顧客支持的成效。每半年向創新科技署提交的進度報告也便於查考項目的進展以及達標程度。董事局的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。

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。

目標訂定、風險管理和控制

本年度內，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，並每年更新，以進一步增強應科院有效的管治。

品質管理系統

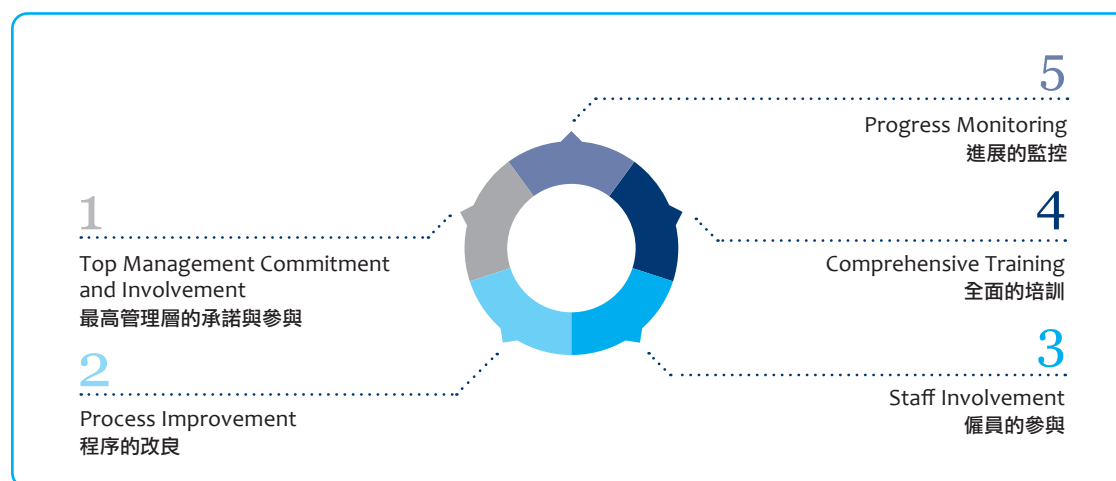應科院於多年前曾取得 ISO 9001:2008 管理程序標準認證，現正進行更新程序。應科院以國際標準化組織（ISO）為基礎的管理系統的四大目標為透明度、效率、切合需要和管治。

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。為取得ISO 9001認證而訂立的五個步驟及成功因素如下：

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

| Stage 步驟 1 Awareness and Planning 意識及計劃 | Stage 步驟 2 Review and Assessment 審查及評核 | Stage 步驟 3 Development 發展 | Stage 步驟 4 Implementation and Verification 實行及鑑定 | Stage 步驟 5 Certification 認證 |

Key Success Factors for Achieving ISO 9001 Certification 成功取得ISO 9001認證的因素

1 Top Management Commitment and Involvement 最高管理層的承諾與參與

2 Process Improvement 程序的改良

3 Staff Involvement 僱員的參與

4 Comprehensive Training 全面的培訓

5 Progress Monitoring 進展的監控

In Stage One, ASTRI formulated a task force headed by top management to implement the ISO programme. The team comprised the Quality Management Manager, department functional managers, ISO auditors, and consultants from an external ISO consultancy company.

The top management is to provide resources and review the suitability and effectiveness of the system. The Quality Management Manager is to ensure functional managers and ISO auditors are involved in establishing and implementing system processes. The external consultants are to provide advice ensuring the system meets ASTRI objectives.

In February 2012, a Town Hall Meeting was held for ASTRI staff during which the ISO 9001 implementation roadmap, benefits, schedule and the task force structure were explained to the attendees. Following that, the Management was briefed on management principles and requirements, and functional managers and ISO auditors were given comprehensive training regarding clause-by-clause interpretation of ISO 9001 requirements.

在第一階段，應科院組成由最高管理層領導的工作組來執行ISO計劃。工作組由品質控制經理、各部門職能經理及ISO審計員，以及一間外聘的ISO顧問公司組成。

最高管理層提供資源及檢討系統是否合適和有效。品質控制經理確保職能經理及ISO審計員參與建立和實踐系統的各個程序。外聘的ISO顧問公司則給予建議，確保系統達到應科院的目標。

我們於二零一二年二月舉辦了一場簡介會，向所有出席的應科院員工解釋了實踐ISO 9001的路線圖、益處、時間表和工作組架構。其後，向管理層講解了管理原則和要求，又給各職能經理及ISO審計員安排了全面的培訓，就ISO 9001的要求，逐一條款予以解釋。

In Stage Two, the ISO consultancy company conducted a comprehensive assessment of ASTRI's operation to identify gaps and improvement areas for the system. The consultants met top management and functional managers to ensure clear understanding of the findings and recommendations. Based on the assessment, the functional managers formulated an action plan to develop processes to meet ISO 9001 requirements.

Looking forward, ASTRI will maintain the momentum and time-line for developing, implementing and verifying ISO implementation. It looks forward to reaping the benefits of ISO 9001 and further improving operation to achieve efficiency and quality.

Health and Safety

With support from the Board and Management to provide 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 on issues relating to safety and health and make decisions.

With advice from the committee, an Occupational Safety and Health Manual was published, providing guidance pertaining to work safety and health, planning and procedures. Regular health and safety inspections were conducted and laboratory representatives were nominated to adopt the practice in their workplace. Also, trainings in first aid, safety management, laser safety, chemical management, etc., were provided to cultivate safety awareness and ensure good safety practice a working norm at ASTRI.

Business Ethics and Law

It is believed that a good understanding of business ethics is fundamental in making ASTRI a virtuous organization and enabling the supply of talent with high integrity to industry. Hence, a series of mandatory workshops on Business Ethics and Law were conducted for Management and staff at the end of 2011. A lecturer from the Faculty of Law at the Chinese University of Hong Kong, was invited to address the workshop. 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.

在第二階段，ISO顧問公司對應科院的運作進行全面的評估，辨識系統的缺失和可改善之處。顧問亦與最高管理層及職能經理會面，確定對方清楚瞭解評估結果和建議。根據評估，職能經理擬定行動計劃，制訂程序以符合ISO 9001要求。

展望將來，應科院將努力不懈，並根據既定的時間表，發展、實行和查核ISO的執行情況，應科院期望在ISO 9001管理程序下，繼續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及健康的工作環境，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，為職員和管理層提供一個平台，就有關安全與健康的議題交換意見及作出決定。

委員會已完成一份職業安全及健康手冊，為有關工作安全及健康，以及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急救、安全管理、鐳射安全、化學品管理等訓練，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。

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。

People
人才匯聚

Connecting Dreams and Ambitions

鼓勵創意　助實現理想

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 R&D Vice Presidents, as well as headquarters senior executives who are responsible for administrative, financial, commercial and other essential functions.

應科院由行政總裁負責整體管理工作，並對董事局負責。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、商務及其他重要職責。

As at 31 March, 2012
截至二零一二年三月三十一日

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 [2]
首席科技總監　任德盛教授

Ms. Betty Law, Chief Financial Officer [3]
首席財務總監　羅翠萍女士

Mr. David Poon, Vice President, Corporate Communications and Company Secretary [4]
副總裁（傳訊）及公司秘書　潘占達先生

Mr. Keith Poon, Vice President, Marketing and Commercialization [5]
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 [7]
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 [8]
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 [9]
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 [10]
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 ASTRI Senior Executives 應科院高級行政人員薪酬

Post 職級	Annual Remuneration 1 April, 2011- 31 March, 2012 (HK$M) 由二零一一年四月一日至 二零一二年三月三十一日全年薪酬（百萬港元）
Chief Executive Officer 行政總裁	3.6
Six Level One Executives 六名一級員工	12.3
20 Level Two Executives 二十名二級員工	27

Annual Remuneration 1 April, 2011- 31 March, 2012 (HK$) 由二零一一年四月一日至 二零一二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	3
1,000,001 – 1,500,000	12
1,500,001 – 2,000,000	6
2,000,001 – 2,500,000	4
2,500,001 – 3,000,000	1
3,000,001 – 3,500,000	0
3,500,001 – 4,000,000	1

A Growing Workforce
茁壯的人力資源

ASTRI builds its success on staff contributions. ASTRI's workforce comprises teams of talented and dedicated professionals with good academic background and work experience in Hong Kong, the Mainland and the world. A majority of its staff, over 85 per cent, is involved in R&D work focusing on various technology areas of their expertise. The following is the profile of ASTRI's people in the year under review.

應科院的成功建基於人才所作出之貢獻。本院的人力資源主要由擁有良好教育背景及工作經驗的專業人士組成，包括來自本地、中國內地及世界各地的人才。本院大部分員工為科技人員，百分之八十五或以上員工，都從事著他們所專長的，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數據分析。
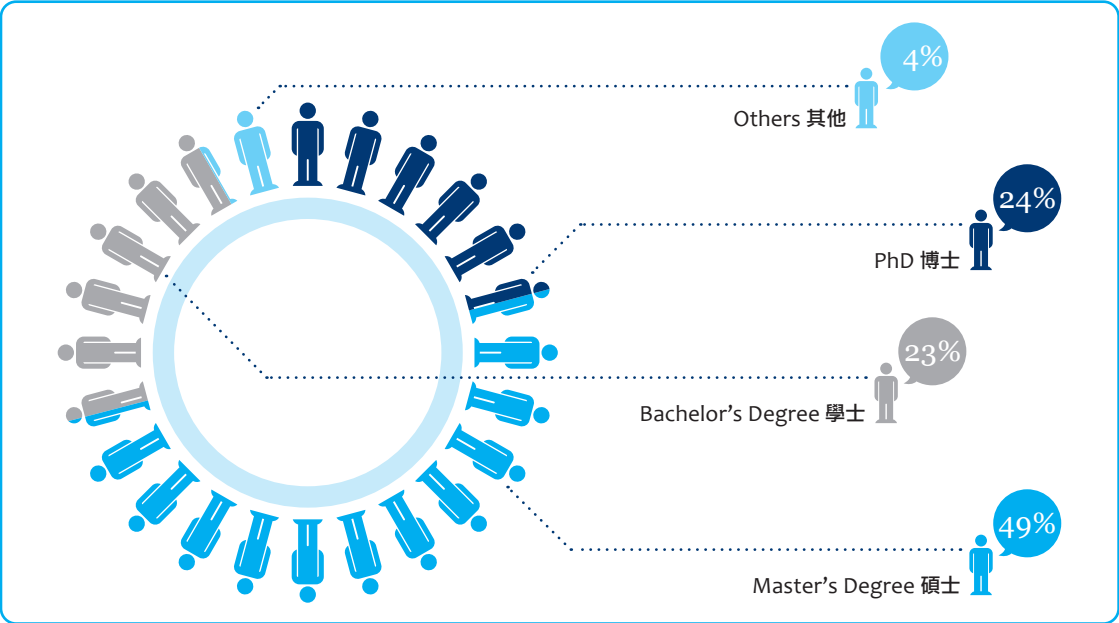
Headcount Status 員工人數

		As at 31 March, 2012 截至二零一二年三月三十一日	As at 31 March, 2011 截至二零一一年三月三十一日
Headquarters	**總部**	85	77
R&D Group	**研發群組**		
Communications Technologies	通訊技術	117	133
Enterprise & Consumer Electronics	企業與消費電子	126	125
IC Design	集成電路設計	96	86
Material & Packaging Technologies	材料與構裝技術	121	118
Bio-Medical Electronics (Team)	生物醫學電子（組）	16	12
Exploratory Research Laboratory (Team)	信息研究室（組）	6	N.A. / 不適用
Interns	實習研究員	19	34
Sub-total	**小計**	**501**	**508**
Total	**總數**	**586**	**585**

Academic Qualification of ASTRI Staff 員工學歷

As at 31 March, 2012
截至二零一二年三月三十一日

Including R&D and non-R&D staff, not including interns
包括研發人員、非研發人員，但不包括實習研究員

Others 其他 4%

PhD 博士 24%

Bachelor's Degree 學士 23%

Master's Degree 碩士 49%

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

Nurturing Talent

ASTRI is devoted to recruiting and nurturing new talent for industry and cultivating R&D interest in the younger generation. In addition to hosting ASTRI Open Day and delivering career talks at local universities, ASTRI organizes internship programmes every year, attracting enrolment from many local and overseas graduates.

ITC Internship Programme

Since 2009 ASTRI has been offering internship opportunities to local university graduates through the internship programme funded by the Innovation and Technology Commission. The programme allows young talent interested in an applied R&D career to gain exposure and acquire training from the wide spectrum of high standard research projects at ASTRI. So far, about 100 university graduates have joined ASTRI through this programme and some of them were offered engineering positions before completing their internship.

Summer Internship Programme

In the summer of 2011, ASTRI initiated a summer internship programme for science and engineering students, giving them the opportunity of gaining some hands-on research experience in an actual environment before they graduate. The programme was successful in attracting both local and overseas students from as far as Canada, the United States and the United Kingdom. Among the 28 summer interns at ASTRI were students from renowned universities such as Princeton, Massachusetts Institute of Technology and University of California, Los Angeles.

Chief Executive Officer
Dr. Cheung Nim-kwan (left)
with summer interns
from the U.S
應科院行政總裁張念坤博士（左）與
部份來自美國的暑期實習研究員合攝

培育人才

應科院致力為業界招聘和孕育新人才，以及培養年青一代對研發工作的興趣。除了在大學舉行開放日及職業講座，應科院每年舉辦實習研究員計劃，吸引不少本地及海外畢業生參加。

創新科技署實習研究員計劃

應科院自二零零九年起，透過創新科技署資助的實習研究員計劃，為本地大學畢業生提供實習機會。該計劃讓有志於以應用研究作為職業人士，藉著參與本院高水平及範圍廣的研究工作，從中獲取經驗和培訓。自計劃開始以來，約有一百名大學畢業生加入本院工作，部份在完成實習之前已獲聘任為工程師。

暑期實習研究員計劃

應科院在二零一一年暑假舉辦暑期實習研究員計劃，讓理科及工程系學生，在畢業前有機會在現實環境中體驗研究工作。該計劃成功吸引本地及來自加拿大、美國和英國共二十八名學生參加，當中包括來自著名學府，如普林斯頓大學、麻省理工學院及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 success and achievements. ASTRI won prestigious accolades and awards at both local and international levels this year, reflecting staff capability in conveying state-of-the-art technologies to industry and community.

應科院以員工所取得的成就為驕傲。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能力及其為業界及社會所創的先進科技。

Institute of Electrical and Electronics Engineers (IEEE) Fellows

Distinguished R&D group leaders Dr. Wang Keh-chung and Dr. Wu Enboa were both conferred the prestigious title of IEEE Fellow by the world's largest association in the engineering profession.

Dr. Wang, Vice President and Group Director, IC Design Group, was recognized by IEEE for contributions to GaAs HBT integrated circuits for high-speed data conversion and optical fibre communication systems. Dr. Wu, Vice President and Group Director, Material & Packaging Technologies Group, was recognized by IEEE for contributions to light emitting diode and packaging technologies.

The title of IEEE Fellow is the highest membership and is recognized by the technical community as an esteemed honour and an important career achievement.

There are four senior ASTRI executives holding this title. Besides Dr. Wang and Dr. Wu, they are Dr. Cheung Nim-kwan, CEO, and Dr. Justin Chuang, Vice President and Group Director of Communications Technologies Group.

國際電機電子工程師學會院士

應科院兩位傑出研發群組領導，王克中博士及吳恩柏博士，同時獲得由全球最大的工程師學會頒授國際電機電子工程師學會院士榮銜。

集成電路設計群組副總裁及研發群組總監王克中博士，因其在 GaAs HBT 高速數據轉換和光纖通訊系統集成電路所作的貢獻而獲此殊榮；材料與構裝技術群組副總裁及研發群組總監吳恩柏博士則在LED及構裝技術方面作出貢獻而獲得學會的高度肯定。

國際電機電子工程師學會院士榮銜是該學會所頒授的最高會員資格，亦是工程及科技界所推崇的至高榮譽和重要成就。

應科院共有四名高級行政人員擁有此榮銜，除了王博士和吳博士，還有行政總裁張念坤博士及通訊技術群組副總裁及研發群組總監莊哲義博士。

Dr. Wu Enboa (left) and
Dr. Wang Keh-chung
吳恩柏博士（左）及王克中博士

The Hong Kong ICT Awards 2012
Grand Award, Best Lifestyle
Gold Award, Best Lifestyle (Social, Communications & Media)
二零一二年香港資訊及通訊科技獎
最佳生活時尚獎大獎
最佳生活時尚獎（社交・傳訊・媒體）金獎

ASTRI won these two awards with the newly developed 2D-3D Real-time Conversion Platform. This novel invention can instantly change 2D images from any video sources into very natural and high-quality 3D visuals, enriching entertainment and enhancing lifestyle. Also, it can be easily configured to suit a great variety of 3D display devices. The special features it offered will greatly enhance the adoption of 3D technologies in the market.

應科院開發的二維至三維實時轉換平台榮獲上述兩大獎項。此項嶄新技術可即時將二維影像轉換成高質素及效果自然的三維立體影像，並不局限於任何影像來源，為娛樂和生活增添姿彩。此技術還可以與多類型三維顯示設備靈活地配置使用，這些特點都有助推動三維技術的普及化。

The winning team at the award presentation ceremony
獲獎團隊於頒獎禮上大合照

▶ Winning Team 獲獎團隊

Mr. Li Yiu-kei, Director, Project Proposal 李耀基先生，總監，負責項目籌劃	Mr. Mark Mok, Senior Manager, Project Proposal, Execution and Management 莫秉燦先生，高級經理，負責項目籌劃、執行及管理
Mr. Chiu King-hung, Senior Manager, Algorithm Design 趙京雄先生，高級經理，負責算法設計	Mr. Tim Wong, Senior Engineer, Algorithm Design 黃嘉隆先生，高級工程師，負責算法設計
Ms. Liu Xuejiao, Engineer, Algorithm Design 劉雪嬌小姐，工程師，負責算法設計	Mr. Luo Peng, Engineer, Algorithm Design 羅鵬先生，工程師，負責算法設計
Mr. Alan Cheung, R&D Director, Hardware Design and Implementation 張偉倫先生，研發總監，負責硬件設計及實現	Mr. Brian Lam, Senior Engineer, Hardware Design and Implementation 林子源先生，高級工程師，負責硬件設計及實現
Mr. Rex Cheung, Senior Engineer, Hardware Design and Implementation 張一鵬先生，高級工程師，負責硬件設計及實現	Mr. Walter Chow, Engineer, Hardware Design and Implementation 周松水先生，工程師，負責硬件設計及實現
Mr. Zeng Yu, Engineer, Hardware Design and Implementation 曾宇先生，工程師，負責硬件設計及實現	Mr. Chen Hongzao, Project Intern, Hardware Design and Implementation 陳鴻藻先生，實習研究員，負責硬件設計及實現
Mr. Band Chen, Senior Engineer, Firmware Development 陳幫紅先生，高級工程師，負責韌體開發	

The Hong Kong ICT Awards 2012
Gold Award, Best Lifestyle (Green, Healthy & Creative Living)
二零一二年香港資訊及通訊科技獎
最佳生活時尚獎（綠色．健康．創意）金獎

ASTRI and Solomon Systech representatives at the award presentation ceremony
應科院與晶門科技代表於頒獎禮上合攝

ASTRI won this award with 3D Dual-LCoS Mini-projector technology. This palm-size projector is first-of-its-kind in the world and is a joint invention with Solomon Systech. It is very easy to carry and it can project display as big as 60-100 inches with very low power consumption.

應科院憑藉其與晶門科技有限公司合作研發的3D雙LCoS微型投影機而榮獲此獎項。此投影機的體積只有手掌般大，是全球首部3D微型投影機。它的好處是體積小方便攜帶、耗電量低，但可以投放60至100吋大的畫面。

▶ Winning Team 獲獎團隊

Mr. Kenny Chan, Senior Manager, Project Proposal, Coordination and Execution 陳建龍先生，高級經理，負責項目規劃、統籌及執行	Mr. Dennis Chau, Senior Engineer, Electrical System Design, Simulation and Integration 鄒澤偉先生，高級工程師，負責電子系統設計、模擬及集成
Dr. Chi Yong, Senior Engineer, Mechanical Structure Design and Thermal Optimization 池勇博士，高級工程師，負責散熱分析與機械結構設計	Mr. Tang Weiping, Engineer, Optical Design 湯偉平先生，工程師，負責光學設計
Mr. Jay Wong, Engineer, Electrical Driving 黃超豪先生，工程師，負責電子驅動	Ms. Wendy Zhang, Senior Engineer, Image Processing 張瑋女士，高級工程師，負責圖像處理

The Hong Kong ICT Awards 2012
Bronze Award, Best Green (Innovation)
二零一二年香港資訊及通訊科技獎
最佳綠色科技獎（創新）銅獎

ASTRI won this award with the Tyre Pressure Monitoring System (TPMS). By providing real-time tyre condition monitoring, TPMS can enhance driving safety and reduce tyre wear. The system was applied on BYD's electric bus.

獲獎的輪胎監察系統透過實時監察輪胎狀態，能有效減低輪胎磨損度，令駕駛更安全。此系統曾獲比亞迪使用在其電動大巴上。

Dr. Ivan Sham (second from right) and team members receiving the award
沈文龍博士（右二）與隊員接受獎項

The Hong Kong ICT Awards 2012
Bronze Award, Best Lifestyle (Learning & Living)
二零一二年香港資訊及通訊科技獎
最佳生活時尚獎（學習‧生活）銅獎

ASTRI won this award with its self-developed I-T Frame which can be attached to different kinds of displays, such as PC monitor, flat panel and projection screen. With this frame, any normal display can be automatically changed into an interactive touch panel.

應科院以自主研發的I-T Frame互動觸控框獲得此獎項。I-T Frame是一套外置框架，適用於多種類型的顯示器，如電腦顯示屏、平板顯示或投影屏幕。有了這個外置設備，任何顯示器都能簡易地改裝為互動式觸控屏。

Dr. Crystal Fok (second from left) and team members receiving the award
霍露明博士（左二）與隊員代表應科院領獎

▶ Winning Team 獲獎團隊

Dr. Crystal Fok Lo-ming, Manager, Project Coordination and Optical System Design 霍露明博士，經理，負責項目統籌及光學系統設計	Dr. Zhu Xiuling, Senior Engineer, Algorithm Design and System Integration 朱秀玲博士，高級工程師，負責算法設計及系統整合
Mr. Jim Li Xurong, Engineer, Coding and Interface Design 李栩榮先生，工程師，負責編程及界面設計	Ms. Ye Lichun, Engineer, Hardware and Firmware Development 葉麗春女士，工程師，負責硬件及韌體設計
Mr. Zhang Yihong, Engineer, Mechanical Structure Design 張鈇洪先生，工程師，負責機械結構設計	

▶ Winning Team 獲獎團隊

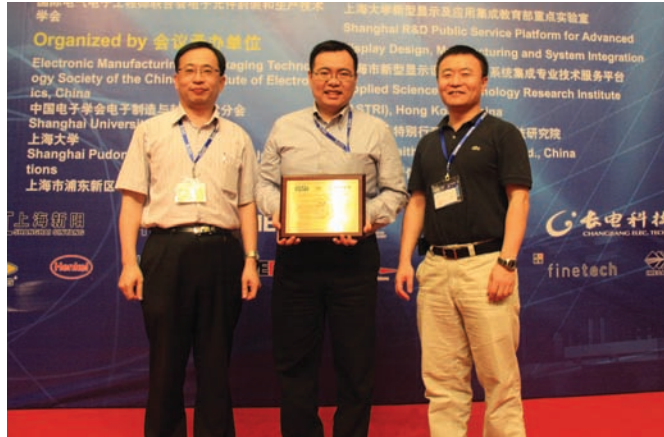|	
Dr. Ivan Sham Man-lung, Senior Manager, Technology and Team Developments, and Project Management 沈文龍博士，高級經理，負責技術與團隊發展及項目管理	Mr. Carlos Chow Shi-wo, Senior Engineer, Project Management, Coordination and Design 鄒仕和先生，高級工程師，負責項目管理與統籌及安裝設計
Dr. Xiao Mingxiang, Senior Engineer, Antenna Design Optimization 肖明祥博士，高級工程師，負責天線設計優化	Mr. Jackie Chau Chi-hing, Senior Engineer, System Software Development; 周志興先生，高級工程師，負責系統軟件開發
Mr. Andy Lee Hang-sang, Senior Engineer, Electrical Design 李恆生先生，高級工程師，負責電子設計	Mr. Jeff Xie Kaiwang, Engineer, Housing Design 謝開旺先生，工程師，負責外殼設計

Outstanding Paper Award, International Conference on Electronic Packaging Technology & High Density Packaging (ICEPT-HDP) 2011
二零一一年中國電子封裝技術及高密度封裝國際會議最佳論文獎

Representatives of ASTRI and its partner at the award presentation ceremony
應科院與合作公司代表上台領獎

ASTRI partnered with Guangdong Yuejing High Technology Company to win this award with the paper "Challenges in Developing Cost-effective System-in-Package for Tyre Pressure Monitoring System". The ICEPT-HDP is the biggest international conference of its kind on the Mainland.

應科院夥拍廣東省粵晶高科公司，發表題為「開發具成本效益的輪胎壓力監測系統級構裝所面對的挑戰」的論文而獲得此獎項。中國電子封裝技術及高密度封裝國際會議是國內最具規模的同類型構裝國際會議。

Winning Team 獲獎團隊

Dr. Ivan Sham Man-lung, Senior Manager, Technology and Team Developments, 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

Mr. Carlos Chow Shi-wo, Senior Engineer, Project Management, Coordination and Design
鄒仕和先生，高級工程師，負責項目管理與統籌及安裝設計

Certification of Appreciation for P1734 Standardization
IEEE Standards Association
國際電機電子工程師學會（IEEE）標準協會
P1734標準化銘謝狀

An R&D team of ASTRI joined IEEE Quality IP P1734 Working Group in 2009 to help standardize IP qualification to IEEE standard. The P1734 was approved by the IEEE Standards Association in June 2011. The team received the "Certification of Appreciation" for their outstanding contributions in developing this new quality standard for electronic and software intellectual property used in SoC designs.

應科院一隊研發團隊於二零零九年加入IEEE IP質量P1734工作組，致力推動IP質量驗證標準化。P1734於二零一一年六月正式成為IEEE標準。研發團隊獲IEEE頒發銘謝狀，以表彰其在新標準制定過程中所作的貢獻。P1734是有關在系統晶片設計使用的電子及軟 IP質量的IEEE標準。

IEEE Certification of Appreciation for P1734 standardization
IEEE P1734標準化銘謝狀

Certificate of Excellent Paper, International Conference on Chemistry and Chemical Engineering 2011
二零一一年化學與化學工程國際會議優秀論文證書

ASTRI won this honour with the technology of fabricating novel anode material for lithium ion batteries. The project aims at developing a novel anode material for improving capacity of lithium ion batteries which is expected to be widely used in commercial lithium ion batteries in future.
應科院開發新穎的鋰離子負極材料技術而榮獲此獎項。此項目的研究目的是通過開發新的負極材料來提高鋰離子電池的容量，預期此負極材料將來在商業化鋰電池中會被廣泛應用。

Mr. Jiang Yingkai, who presented the paper at the conference, is seen here with the award
江英凱先生代表應科院在會議上發表論文，因而獲獎

▶ Winning Team 獲獎團隊

Dr. Lim Pau-yee, Senior Manager, Project Proposal and Execution, Preparation Process Design and Integration 林葆喜博士，高級經理，負責項目籌劃及執行、製備過程設計與整合	Dr. Li Yingshun, Senior Engineer, Material Characterization and Electrochemical Performance Analysis 李英順博士，高級工程師，負責材料表徵測試及電化學行為分析
Mr. Jiang Yingkai, Engineer, Material Polymerization Process Design, Coin Cell Assembly and Evaluation 江英凱先生，工程師，負責材料有機聚合過程的設計及扣式電池組裝與測試	

▶ Winning Team 獲獎團隊

Mr. Li Yiu-kei, Director, Project Proposal and Execution 李耀基先生，總監，負責項目籌劃及執行	Mr. Mark Mok Ping-chan, Senior Manager, Project Proposal and Execution, Hard IP and Soft IP Qualification Platform Design 莫秉燦先生，高級經理，負責項目籌劃及執行、軟IP及硬IP驗證平台設計
Mr. Kenneth Lo Chun-keung, Senior Engineer, Hard IP and Soft IP Qualification Platform Design 盧振強先生，高級工程師，負責軟IP及硬IP驗證平台設計	Dr. Jiao Yuzhong, Engineer, Hard IP Qualification Platform Design 焦玉中博士，工程師，負責硬IP驗證平台設計
Mr. Ng Ka-lun, Project Intern, Soft IP Qualification Platform Design 吳嘉麟先生，實習研究員，負責軟IP驗證平台設計	Mr. Jordy Li Ping-shing, Project Intern, Soft IP Qualification Platform Design 李秉鋮先生，實習研究員，負責軟IP驗證平台設計

External Appointments
外界任命

Dr. Cheung Nim-kwan, Chief Executive Officer 行政總裁 張念坤博士	
» Chair, Institute of Electrical and Electronics Engineers (IEEE) Fellow Committee 2012	» 2012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, Government Secretariat, HKSAR	» 香港特區政府總部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, Electronics/Electrical Appliances Industries Advisory Committee, Hong Kong Trade Development Council	» 香港貿易發展局電子及電器產品業諮詢委員會委員
» Conference Track Leader, IEEE Cloud Computing Initiative	» 國際電機電子工程師學會雲計算倡議會議跟進領導
Prof. Peter Yum, Chief Technology Officer 首席科技總監 任德盛教授	
» Member, Appeal Tribunal Panel, Building Ordinance (Cap.123), Planning and Lands Branch, Development Bureau, Government Secretariat, HKSAR	» 香港特區政府總部發展局規劃地政科建築物條例 （第123章）上訴審裁小組委員
» Member, Disciplinary Tribunal Panel, Electricity Ordinance (Cap.406), Environment Bureau, Government Secretariat, HKSAR	» 香港特區政府總部環境局電力條例 （第406章）紀律審裁小組委員
» Senior Technical Editor, IEEE 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, China	» 中國廣東省信息技術標準化技術委員會委員

Dr. Chao Shen-chang, Vice President and Group Director 副總裁及研發群組總監 趙盛章博士

» Advisory Member, Advancing Technology for Digital Home	» 數字家庭技術進展顧問委員會委員
» Adviser, External Advisory Committee, Computer Science and Engineering Department, The Hong Kong University of Science and Technology	» 香港科技大學計算機科學及工程學系外部諮詢委員會委員
» Member, 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, Assessment Panel, Small Entrepreneur Research Assistance Programme (SERAP) , ITC	» 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, Industrial Advisory Board, 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, IT Department at United Christian Hospital	» 基督教聯合醫院信息技術部門榮譽顧問
» Co-opted Member, Admission Panel of Incu-App Technology Incubation Programme, Hong Kong Science and Technology Parks Corp.	» 香港科技園公司網動科技創業培育計劃審批委員會外部評審員

Dr. Wang Keh-chung, Vice President and Group Director 副總裁及研發群組總監 王克中博士

» Member, Technical Programme Review Committee, TA-24 on "Digital Processing Circuits and Systems at GHz Speed" , International Microwave Symposium 2011, IEEE	» 國際電機電子工程師學會2011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, MTT-9 Technical Coordinating Committee, "Digital Signal Processing" 2011, IEEE	» 國際電機電子工程師學會2011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 2011	» 國際電機電子工程師學會2011年國際射頻集成技術會議論文評審委員
» Reviewer, IEEE MTT Magazine, 2011	» 2011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

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

» Member, Emerging Technologies Committee, IEEE Electronic Components and Technology Conference	» 國際電機電子工程師學會電子元件及技術會議新興技術委員會委員
» 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, China	» 中國福建省信息化局專家
» Adviser, 2011 Technical Advisory Committee, Mechanical & Systems Research Laboratories, ITRI, Taiwan	» 2011年台灣工業技術研究院機械與系統研究所技術咨詢委員會顧問
» Panel Co-moderator, 2011 International Symposium on Advanced Packaging Materials	» 2011年國際先進構裝材料會議小組會議聯席主持人
» Member, Centre Advisory Committee, The Hong Kong University of Science and Technology R&D Centre, Foshan, China	» 中國佛山香港科技大學研發中心中央咨詢委員會委員

Mr. David Kwong, Vice President and R&D Director 副總裁及研發總監 鄺國權先生	
» Member, Senior Member Review Board, IEEE	» 國際電機電子工程師學會高級會員評審會會員
Dr. Francis Lee, Vice President and R&D Director 副總裁及研發總監 李致淳博士	
» Member of the Potential Employers, Accreditation, BSc (Hons) in Green Energy Science, Hong Kong Baptist University	» 香港浸會大學綠能科學學士班確認程序可能僱主團成員
Dr. James Lei, Director 總監 雷志斌博士	
» Reviewer, IEEE Communications Magazine	» 國際電機電子工程師學會通訊雜誌評審員
Dr. Jay Liou, Director 總監 劉遠昭博士	
» Editorial Member, Advancing Technology for Digital Home	» 數字家庭技術進展編委會委員
Dr. Daniel Shi, Director 總監 史訓清博士	
» Guest Professor, The Peking University	» 北京大學客席教授
» Guest Professor, The Shanghai Jiaotong University	» 上海交通大學客席教授

Connecting People with Innovative Technologies
服務社群　添生活新意

Communications Technologies Group
通訊技術群組

4G/ LTE

Communication Software
通訊軟件

Broadband/ Broadcasting Communications
**寬帶／廣播通訊**

Antenna/RF Systems
天線／射頻系統

During the year, Communications Technologies (CT) Group achieved significant progress in developing and delivering applied information and communications technologies (ICT) involving 4G/LTE, communications software, broadband/broadcasting communications and antenna/RF systems.

回顧過去一年，通訊技術群組在資訊及通訊應用技術（ICT）方面取得重大進展，其中包括4G／LTE、通訊軟件、寬帶／廣播通訊及天線／射頻系統。

RFIC Laboratory
射頻集成電路實驗室
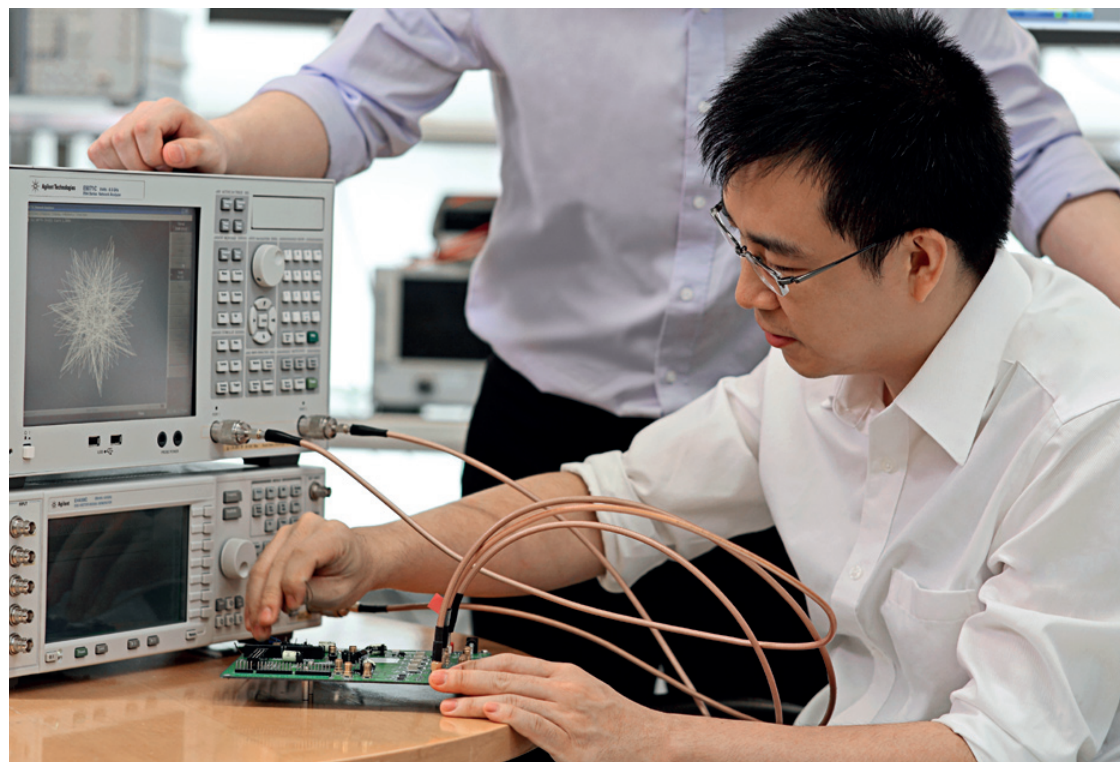
What is your dream invention?
你的理想發明是什麼？

It will be great if we have a machine to take us anywhere on earth within seconds.
假若有一部機器，可以秒速帶我們到地球的任何角落便好極了。

Mr. Wu Zhiwei 吳稚瑋先生
Engineer 工程師

What is your dream invention?
你的理想發明是什麼？

I dream that time machine and transporter can be invented one day.
我夢想有一天可載人穿梭時空的時光機會被發明出來。

Mr. Wong Cheong-yui 黃昌銳先生
Manager 經理

4G LTE Data Card
4G LTE 數據卡

4G LTE Data Card enables broadband internet access in high-speed trains.
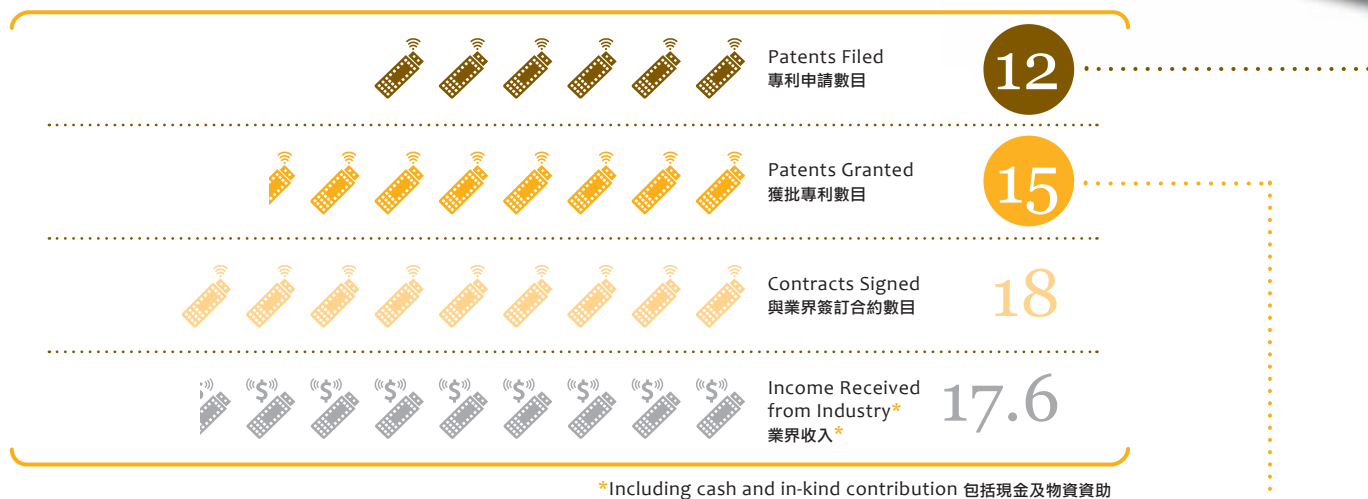4G LTE數據卡支持在高速列車上寬頻上網。

On innovation and commercialization, CT made remarkable achievements in patents filed and granted, technology transfers and income from industry. A total of 15 patents were granted in areas including MIMO, antenna and wireless networks. A total of 12 patent applications were filed in areas covering LTE, antenna and RF receiver. Of 18 technology transfers signed during the year, Hong Kong customers accounted for more than 50 per cent, with the rest from the Mainland, Taiwan and the United Kingdom. A total income of HK$17.6 million was received from industry including more than HK$7 million in royalty.

在技術突破及市場化方面，通訊技術群組在專利的申請及獲批、技術轉移及從業界取得收入幾方面均取得卓越成績。其中獲批的專利共十五項，技術範疇包括實用多天線、天線和無線網絡；提交的專利申請共十二項，涵蓋LTE、天線和射頻接收器等技術。另外，群組向業界轉移的技術達十八項，其中超過半數以上客戶來自香港，其他來自中國內地、台灣和英國。群組於本年度從業界獲得收入總額共一千七百六十萬港元，其中包括超過七百萬港元的版稅收入。

4G LTE Data Cards support both TD LTE and LTE FDD standards
4G LTE數據卡支持TD LTE及LTE FDD兩個標準

= 2 number 數目   = 2 million(HK$) 百萬(港元)

Patents Filed
專利申請數目   **12**

Patents Granted
獲批專利數目   **15**

Contracts Signed
與業界簽訂合約數目   18

Income Received
from Industry*
業界收入*   17.6

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

Patents Filed 專利申請

Technological Areas	涉及科技範疇
LTE	LTE
Antenna	天線
RF receiver	射頻接收器

Patents Granted 獲批專利

Technological Areas	涉及科技範疇
MIMO	實用多天線
Antenna	天線
Wireless Networks	無線網絡

Communications Technologies Group
通訊技術群組

Innovations
技術突破
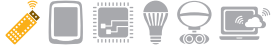
Want to know more?
想認識更多？

4G LTE Tablet
4G LTE 平板電腦

4G LTE Tablet enables mobile HD video conferencing and video streaming.
4G LTE平板電腦支持移動高清視像會議及視像流傳輸。

Tablet embedded with
4G LTE chipset
嵌入了4G LTE晶片的平板電腦

As a leader in 4G/LTE technologies, the Group developed with its partner the first commercial-grade TD-LTE small cell reference design. CT's design supports both FDD and TDD modes providing customers with a compelling solution to seamlessly offload and expand coverage for high-speed data. The technology was demonstrated at the Mobile World Congress 2012.

Meanwhile, CT also made significant contribution in LTE-user terminal technology after the demonstration of the world's first TD-LTE data card SoC at the 2010 Shanghai World Expo. With advanced MIMO techniques, enhanced uplink SC-FDMA and carrier aggregation technologies, customers can greatly reduce development time of a LTE baseband chip for user terminals.

群組憑藉其傲視同儕的4G/LTE技術，與合作夥伴研發出業界首款商用級長期演進（LTE）小蜂窩基站參考設計。該設計能同時支持FDD和TDD模式，為客戶提供無縫分載、高速數據傳輸及延伸覆蓋的全面解決方案。相關技術已於2012年全球移動通訊大會中展示。

另一方面，群組繼於2010年上海世博會上展示全球首款TD-LTE數據卡晶片之後，在LTE用戶終端技術方面又作出了重大貢獻。憑藉先進的MIMO技術、增強型上行鏈路的單載波頻分多址（SC-FDMA）及載波聚合技術，為客戶大大降低用於LTE終端基帶晶片的開發時間。

↑ 4G Internet kiosk set up at Hong Kong Science Park
於香港科學園設置的4G試驗站

此外，群組亦開發了支持TD-SCDMA/LTE MIMO的射頻收發器，為下一代的移動終端提供高性能、節能及創新功能的優勢。該射頻收發器採用65nm低功耗的CMOS技術，支持700MHz至3.8GHz的頻段和1.4MHz至20MHz的寬帶。

在網絡方面，群組開發了符合3GPP標準的EPC解決方案，並將該技術授權予一家無線解決方案的業界領導者。EPC是3GPP LTE無線通訊標準的核心網絡架構，提供統一的移動核心功能及端到端IP服務傳送。

在其創新的射頻及天線技術基礎上，群組進一步研發出新技術，包括數碼預失真技術（DPD）的功率放大器，其線性度提升至20-25%（原本線性度為10-15%），以及寬帶基站天線設計，其支援的頻率頻寬為700-800MHz。

↓ Customized RF Jamming Device deployed in road toll can prevent target reader from picking up transmission mistakenly from adjacent lane
定制設計的射頻干擾器，可通過發射目標特定頻率，以防止目標閱讀器誤讀取相鄰車道的通訊訊號

Also, CT developed a high-performing, energy-saving and innovative functional TD-SCDMA/LTE MIMO RF transceiver for next generation mobile terminals. It covers band frequencies from 700MHz to 3.8GHz, and bandwidth from 1.4MHz to 20MHz with low-power consumption by 65nm CMOS technology.

On the network side, the Group developed the 3GPP standard based evolved packet core (EPC) solution, which was licensed to a leading wireless solution provider. EPC is the core network architecture of 3GPP's LTE wireless communication standard. It provides unified mobile core functionality and is essential for end-to-end IP service delivery.
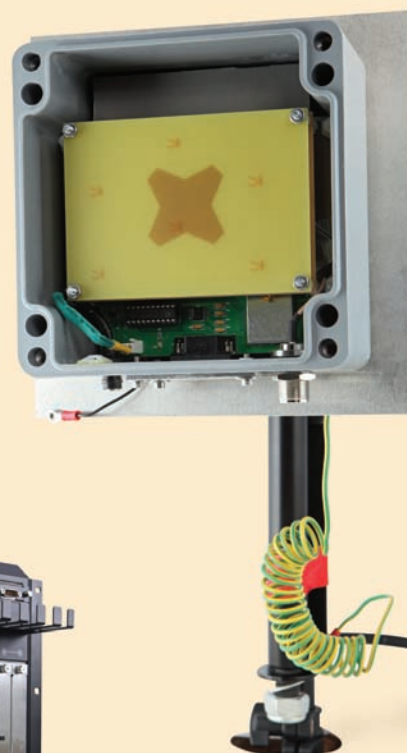
By leveraging its innovative RF and antenna technology, CT developed techniques including a Digital Pre-distortion (DPD) power amplifier with an increased linearity of 20-25 per cent (compared with initial linearity of 10-15 per cent) and a wide-band base station antenna with 700-800MHz bandwidth.

← ASTRI Evolved Packet Core (EPC) and Small Cell Gateway Software are key components of 4G LTE core network
應科院分組演進核心和小基站網關軟件是組成4G LTE核心網絡的重要部分
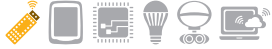
"Unlike reference designs that use 'example code' or 'demo-ware', this is a fully tested, verified and deployable carrier-class TD-LTE baseband system…We appreciate the professionalism and skills of the ASTRI team in working with us to get this carrier-class product developed, tested and released.

有別於使用『演示系統』或『演示軟件』的參考設計，這是一種經過全面測試、驗證和可部署的企業級基帶系統…我們十分欣賞應科院團隊的專業知識和技能，透過雙方合作，我們成功開發、測試和發佈了這個企業級產品。"

Dr. Naser Adas 博士
Vice President and
General Manager,
Wireless and Customer
Premises Equipment (CPE)
at Mindspeed
敏迅科技（無線及終端技術）
副總裁及總經理

Communications Technologies Group
通訊技術群組

Commercialization
市場化

Want to know more?
想認識更多？

**LTE Small Cell Baseband
Reference Design and
Simulation Software
LTE家用小基站基帶參考
設計和模擬軟件**

PicoChip's LTE Femtocell
base station encasing ASTRI's
LTE PHY technology
採用了應科院LTE物理層核心
技術的PicoChip LTE家庭基站

群組與一家跨國夥伴合作開發了首款商用級，同時支持TDD和FDD的長期演進（LTE）家用小基站的可供生產的參考設計。不論在人口稠密的大城市或人煙稀少的偏遠地區，該技術都可大大改進商業和住宅用戶的流動語音和數據服務。透過該小基站的自動配置和自動優化功能，LTE運營商能減低成本和運營開支，同時更有效地提高網絡的容量和效率。該技術已授權予敏迅科技，一家在小蜂窩無線技術具領導地位並於納斯達克上市的美國公司。

群組不斷推出極具成本效益和競爭力的軟件技術，其IP骨幹網絡管理系統（NMS）技術已授權予台灣一家主要的系統集成商並在台灣最大的多協議標籤交換（MPLS）營運商部署。面對網絡系統操作的挑戰，群組提供優秀的軟件解決方案，包括以精簡的方式監測和管理多廠商的端對端網絡設備，以減少集成時間和提高解決方案的質量。

CT collaborated with a global partner and developed the first commercial-grade, production-ready long-term evolution (LTE) small cell reference design supporting both TDD and FDD modes. It greatly improves mobile voice and data service in business and residential premises, metropolitan hot zones and sparsely populated rural areas. With the self-configuring and self-optimization small base stations, LTE operators can reduce capital and operating expenditures, while maximizing network capacity and efficiency. The technology was licensed to Mindspeed Inc, a Nasdaq-listed company and industry leader in small cell wireless technologies in the U.S.

CT continuously offered cost-effective and competitive software technology to customers. Its IP backbone network management system (NMS) technology was licensed to a major system integrator in Taiwan and deployed in the largest nationwide MPLS operator in Taiwan. Addressing challenges in network operating systems, CT provided software solutions featuring multi-vendor management and streamlined end-to-end monitoring to reduce integration time and thus enhance solution quality.

ASTRI and PicoChip joint technology
demonstration
應科院與PicoChip的聯合技術演示

Targeting at the huge Mainland market, ASTRI's RFIC is poised to improve the country's high-end TD-SCDMA and TD-LTE industry chain and reduce IC cost. With key features such as MIMO, direct conversion architecture, low-noise and high-linearity front-end, CT developed differentiating RF technology for the industry. Its LTE RF transceiver technology was licensed to an industry leader. Through this licensing, ASTRI helped establish Hong Kong's role as a technology leader on the Mainland, as well as created a competitive edge for local design houses, OEM and ODM manufacturers.

Digital pre-distortion (DPD) is one of the most fundamental building blocks in wireless communication systems today. CT developed a new platform technology for enabling advanced RF and antenna technology, including DPD for power amplifiers and wide-band base station antennas. The technology was transferred to a Mainland company specializing in software-defined radio industry.

針對龐大的中國市場，應科院開發的射頻技術目的在於改善中國TD-SCDMA及TD-LTE高端產品市場產業鏈和降低晶片的價格。通過提供重點技術包括MIMO、零中頻架構、低噪聲、高線性度的前端技術，群組為業界開發了與眾不同的射頻技術。由群組開發的LTE射頻收發器技術已授權予一家業界領導者。這次技術授權有助確立香港在中國內地的技術領導地位，同時為本地的設計公司、OEM和ODM廠商創造競爭優勢。

數碼預失真（DPD）技術是現今無線通訊系統的重要基石之一。群組為支援先進的射頻和天線技術開發出一個新的技術平台，包括功率放大器的數碼預失真技術和寬帶基站天線。有關技術已授權予內地一家專門從事軟件無線電行業的高科技公司。

ASTRI engineers performing interoperability testing of LTE Small Cell and Terminal
應科院工程師正進行LTE小基站和終端的互操作性測試

Want to know more?
想認識更多？
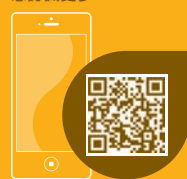
W-CDMA Digital Repeater Reference Design
W-CDMA 的數字直放站參考設計

Communications Technologies Group
通訊技術群組
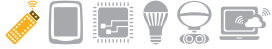
Future Development
未來發展

Antenna and RF system
measurement services
help customers develop
various communications
technologies, including
4G/LTE, enabling sharing of
information in faster speed
天線和射頻系統測試服務可協助客
戶研發多種通訊應用技術,包括
4G/LTE,令資訊分享更快捷

CT will further develop and strengthen its technologies to bring revolutionary changes to people's lifestyle.

The Group's 4G/LTE development plan will focus on LTE-Advanced user equipment and LTE Femotcell Gateway solution.

In RFIC technology, CT will continue working on cost-effective LTE RF transceiver supporting TDD and FDD modes with features such as auto I/Q mismatch and DC offset calibration, excellent linearity and low-power consumption. Meanwhile, the broadband cable team will focus on developing broadband access technology for home networking, targeting at Mainland triple-play market opportunities.

The Group will also leverage the technical capabilities established to deliver advanced antenna and RF technology design, including digital repeaters FPGA architecture and wide-band antennas, location tracking and water seepage detection.

CT has also started working on new technologies in machine-to-machine (M2M) communications for Internet of Things (IoT) to take advantage of the huge market opportunities in M2M application.

展望未來,通訊技術群組將進一步研發先進的技術,為人類生活帶來革命性的改變。

群組的4G/LTE發展計劃將集中在LTE-Advanced的用戶設備及LTE家用基站網關的解決方案。

在射頻技術領域方面,群組將繼續發展具高成本效益的LTE射頻收發器,在支援TDD和FDD模式的同時,亦具備自動I/Q校正和直流漂移校正、卓越的線性度和低功耗等特點。同時,因應中國內地三網融合的市場機遇,群組將重點研發家居網絡的寬帶接入技術。

此外群組將會運用既有的研發能力,提供先進的天線和射頻技術設計,包括數碼中繼器的FPGA架構和寬帶天線、定位追蹤和滲水檢測。

群組已開始研發針對機器與機器(M2M)通訊的物聯網技術,以把握M2M應用的龐大商機。
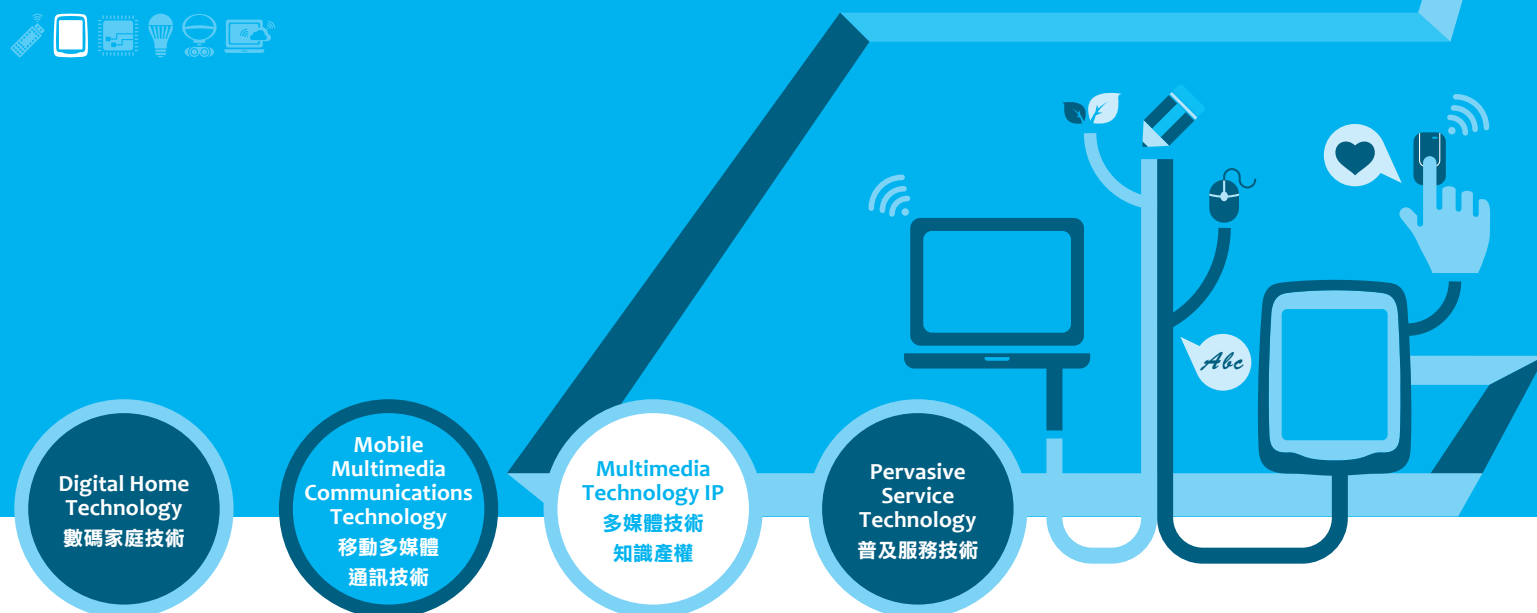
Project Highlights
研發項目

		Project 項目	Duration 時期
1	P	TD-LTE Terminal Baseband Core TD-LTE終端基帶核心	Nov 2009 – May 2011 二零零九年十一月至二零一一年五月
2	P	LTE TDD/FDD Dual-mode Baseband Cores LTE時分及頻分雙模基帶核心	Sep 2010 – Mar 2012 二零一零年九月至二零一二年三月
3	P	LTE Release 9 Evolution and Performance Enhancement LTE第9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
4	S	Next Generation Broadcasting Ethernet Over Cable - High Performance Network Over Coax 下一代廣播電視網的電纜接入技術 — 高性能同軸電纜接入網	Jan – Jul 2011 二零一一年一月至七月
5	S	TD-LTE Propagation Study and Cell Planning TD-LTE訊號傳送研究與佈網規劃	Oct 2010 – Apr 2011 二零一零年十月至二零一一年四月
6	P	Wireless Network Edge Platform 無線網絡接入平台	Jan 2010 – Apr 2011 二零一零年一月至二零一一年四月
7	P	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
8	P	LTE Femto Access Sub-system 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
9	S	Self-organizing Smart Meter Access 具有自組網功能的智能電表接入網	Jun - Dec 2011 二零一一年六月至十二月
10	P	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
11	P	Enhanced DTMB Network 先進的DTMB網絡	Jan 2011 – Jul 2012 二零一一年一月至二零一二年七月
12	S	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
13	P	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

P Platform Project
平台項目

S 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

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

The Enterprise & Consumer Electronics (ECE) Group continued developing technologies targeting at enterprise and consumer markets. In enterprise applications, ECE delivered solutions focusing on creating social impact covering the areas of e-learning, surveillance and tele-health. For the consumer market, ECE delivered the Android-based digital home solution and multimedia intellectual property aiming at large scale production.

企業與消費電子群組繼續為企業和消費市場研發創新技術。針對企業市場需要，群組研發出包括電子學習、監控和遠程保健等幾方面的應用技術，務求為社會創造效益。在消費市場方面，群組開發了基於Android的數碼家庭創新解決方案和多媒體知識產權，以大規模生產為目標。

ECE Laboratory
企業與消費電子群組實驗室

> **Through ASTRI, we partner with Koolsee to add value to our products.**
> 透過應科院，我們與酷視合作，提升了我們產品的價值。

> **Thanks to the support of ASTRI, Koolsee's competitive edge has been greatly enhanced.**
> 酷視的競爭力不斷地提高，實在有賴應科院的協助。

Mr. Tony Cui 崔濤先生
Managing Director,
Koolsee Medianet Corp. Ltd.
酷視媒體網絡有限公司 董事總經理

Mr. Anthony Cheng 鄭雲球先生
Managing Director,
Eight Limited
法特意有限公司 董事總經理

What is your dream invention?
你的理想發明是什麼？

I dream of being able to project the image I have in mind directly on a screen so that I can see.
我幻想能夠將我在腦內構思的圖像直接投射到屏幕上－我看我所想。

Ms. Jessie Ma 馬家欣女士
Interaction Designer 交互設計師

What is your source of inspiration?
你的創作靈感從何而來？

My inspiration comes from everyday life and an understanding of users' experience.
我的創作靈感來自生活和對用戶體驗的了解。
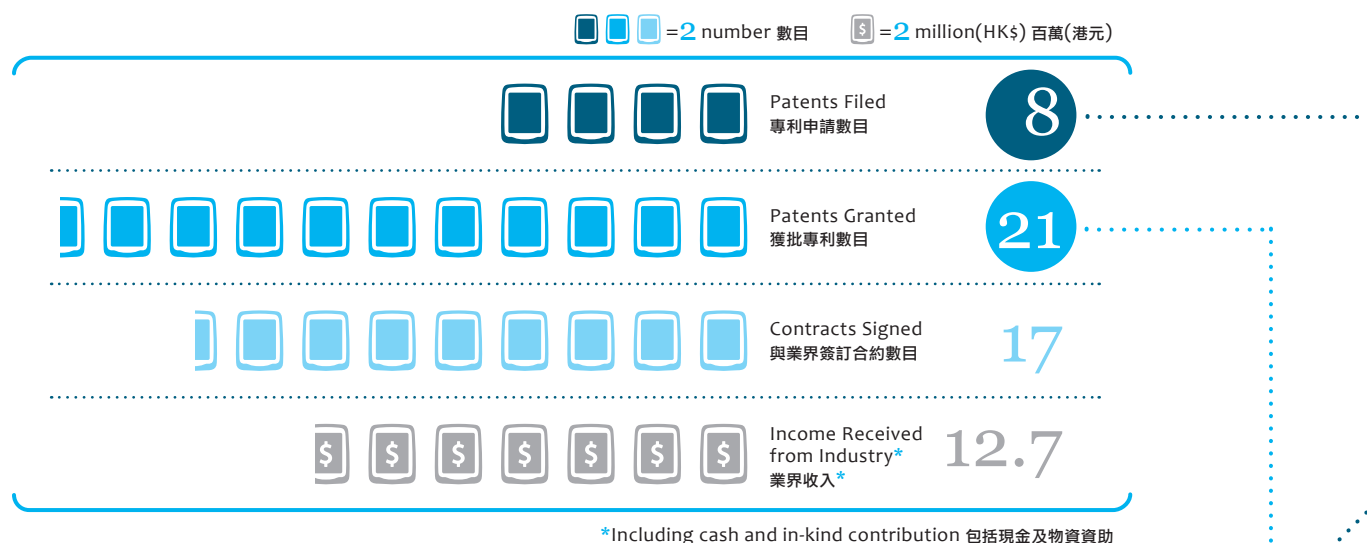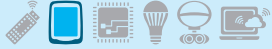
Dr. Wu Taipang 胡大鵬博士
Principal Researcher 首席研究員

Digital Travel
數碼遊蹤

Children enjoy mobile learning by taking part in digital travel game.
兒童透過數碼遊蹤比賽，體驗移動學習樂趣。

In the year under review, ECE obtained 21 patents and filed eight patent applications. It signed 17 contracts for technology dissemination to industry. The total income received from industry amounted to HK$12.7 million.

回顧過去一年，企業與消費電子群組獲批二十一項發明專利，另外共提交了八項專利申請。群組與業界簽署了十七份技術轉移合約，並從業界取得收入總額一千二百七十萬港元。

■■■ = 2 number 數目　　⑤ = 2 million(HK$) 百萬(港元)

Patents Filed
專利申請數目
8

Patents Granted
獲批專利數目
21

Contracts Signed
與業界簽訂合約數目
17

Income Received
from Industry*
業界收入*
12.7

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

Patents Filed 專利申請

Technological Areas	涉及科技範疇
Video Encoding	視頻編碼
Video Summary	視頻摘要
Multimedia over Internet	通過互聯網的多媒體傳輸

Patents Granted 獲批專利

Technological Areas	涉及科技範疇
Video Encoding	視頻編碼
Video Compression Algorithm	視頻壓縮算法
Multimedia over Internet	通過互聯網的多媒體傳輸
P2P	點對點
Motion-based Interaction System	基於運動的互動系統
TV Usability	電視用戶體驗
Voice over IP Security	IP語音安全性
Voice over IP Wireless Roaming between Access Point	IP語音接入點之無線漫遊
Home Networking	家庭網絡
Web Service	Web服務
Testing	測試
Traffic Processing Hardware Design	流量處理硬件設計

Personal Assistant for
e-Learning (PAL)
用於電子學習的「易學夥伴」
設備

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

Innovations
技術突破

Low-cost and High-performance Full HD Video Decoder SoC

The EC803 ASIC is a multi-format full HD hardware video decoder SoC supporting multiple video/ image formats, including H.264, MPEG, Real Video (RMVB), JPEG, etc., with up to 1080P HD video quality.

2D to 3D Real-time Image/ Video Conversion Engine

The 2D to 3D conversion engine has the advantage of depth perception and does not require complicated parameter hand-tuning for different scene contents. It includes a smart depth estimation and high-quality view rendering module. It can be fitted into a Xilinx Spartan-6 XC6SLX25-3 device for real-time video processing at 1920x1080@60Hz fps without using external memory due to its line-based pipeline algorithm.

Video Post-processing

To deal with limited available bandwidth as low as 100 Kbit and deliver video with quality through the Internet, ECE's video post-processing engine provides improved video subjective quality to Internet TV viewers. It consists of de-noising, colour enhancement, scaling, de-interlacing and frame rate conversion modules. Algorithms are well designed and fine-tuned for fitting real-time processing on FPGA/SoC platform with little requirement on internal memory and system bus bandwidth.

User Experience Technology for Seamless Content Sharing among Three Screens

Applying user experience design on Internet TV, seamless and user-friendly content sharing among three screens (TV, tablet and Smartphone) is achieved indoors utilizing DLNA and outdoors through social network connections such as Facebook.

Broadcast Encryption

By carefully choosing appropriate parameters in bilinear pairing and broadcast encryption implementation, ECE optimizes the broadcast encryption group element representation to speed up underlying cryptographic operations. Compared with other related implementations, ECE's effort can achieve excellence in both speed and memory consumption, and therefore is very suitable for a wide range of applications including lightweight computation platforms.

低成本高性能的全高清視頻解碼器系統級晶片

EC803是一個多制式全高清視頻解碼系統級晶片,支援多種視頻/圖像格式,包括H.264、MPEG、Real Video(RMVB)、JPEG等,可達到1080P高清視頻質素的畫面。

二維至三維實時圖像／視頻轉換引擎

企業與消費電子群組開發的二維至三維轉換引擎,可提供較好的三維深度感受,使用者無須對不同類型的場景內容進行複雜的人手參數調整。它包括一個智能深度估計模組和一個高質量的圖像渲染模組。基於行的運演算法,它可以在Xilinx Spartan-6 XC6SLX25-3上達成1920x1080@60幀/秒的實時視頻處理,而且無須使用外部的記憶體。

視頻後置處理

企業與消費電子群組的視頻後置處理引擎,可以在低至100K位元頻寬的情況下,提高視頻圖像的質量,令網絡電視的觀感更佳。該引擎包括去噪、彩色增強、縮放、去隔行和幀率轉換模組。其演算法經過精心設計和調整,對內部記憶體和系統總線帶寬要求較低,非常適合使用於FPGA/ SoC等硬體平台的實時操作上。

以使用者體驗技術實現三種螢幕的內容共享

以使用者體驗設計技術應用於網絡電視上,在室內透過DLNA以及在室外利用社交網絡如Facebook連接,達至在三種螢幕設備(電視、平板電腦和智能手機)之間的無縫連接及內容共享。

廣播加密

在雙線性映射運算和廣播加密運算的實現中,群組通過對運算參數精心的計算和選擇,優化廣播加密運算中群元素的表現方式,並且大大地加快了一些基礎密碼運算的速度。與其它同類的實現相比,群組採用的方法無論在運算速度和記憶體佔用率方面都表現優越。這種實現法適用於大多數的應用平台,包括一些微型計算平台。

Want to know more?
想認識更多？

e-Learning Management System
電子學習管理系統

A central hub that greatly facilitates
teaching and learning.
方便教學和學習的綜合平台 。

Mobile Collaborative e-Learning

ECE's mobile collaborative e-learning technology facilitates teachers to easily incorporate mobile collaborative learning into their curricula, hence enhancing transformation of the traditional education mode. The necessary core technologies include mapping physical objects into digital information, managing networking activities in proximity and lesson planning tools for mobile learning.

e-Reader Annotation Technology

This new technology extends e-reader's capability to share by adding annotation technology on top of ePUB3 standard. It enables users to share annotation via social networks such as Facebook, Weibo, etc., export and import annotation via network storage tools such as Dropbox; synchronize personal annotation across various dervices for sharing with friends.

With this powerful social networking annotation sharing tool, students can extend their reading and learning experience all the way from home to school, greatly improving the effectiveness of e-learning.

移動協作學習平台

企業與消費電子群組研發的移動協作電子學習技術，讓老師可以很容易地將移動協作學習納入教學課程中，有助改革傳統教育模式。其中必要的核心技術包括實物配對識別為數碼資訊、管理鄰近設備的網絡活動，以及移動學習的課程設計工具。

電子閱讀器的注釋技術

在ePUB3標準的基礎上加入注釋技術以擴展電子閱讀器的分享功能。利用此技術，使用者可以透過社交網絡如Facebook、微博等分享注釋；通過公開可用的網絡存儲服務如dropbox，匯出和輸入注釋；並且在不同的設備上與朋友同步分享注釋。

有了這個強大的社交網絡分享注釋工具，學生可以從家庭以至在學校，擴展他們的閱讀和學習經驗，大大提高電子學習的成效。

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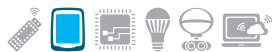
Commercialization
市場化

ECE signed several contracts with industrial partners for technology transfers in the following areas, each with value not less than one million Hong Kong dollars:

企業與消費電子群組就以下幾項技術與客戶簽訂合約作技術轉移，每份合約之價值不少於一百萬港元：

Streaming Content Delivery for Video-on-demand Service This project provides video-on-demand service by streaming content to a specific Android-based tablet.	**流媒體視頻上的電影點播服務** 這是一個以特定的Android平板電腦提供視頻點播服務的項目。
Smart TV in Android Environment Supporting Three-screen Interactions This project focuses on three-screen interaction design and video post-processing under Android environment for smart TV applications.	**智能電視在Android環境中支援三種螢幕設備的互動** 這個項目針對Android環境中智能電視的應用，支援三種螢幕之間的互動設計，以及視頻後處理。
Digital and Internet TV Supporting PVR Function This project covers a hardware reference design and its associated software for digital and Internet TV supporting PVR function.	**數碼及互聯網電視支援個人視頻錄像功能** 這個項目涵蓋數碼及互聯網電視機的硬體參考設計和相關軟體，支援個人視頻錄像功能。
Digital Asset Management and Distribution System This project provides a digital asset management solution covering content format conversion, version control, digital rights management, etc.	**數碼資產管理和分發系統** 這個項目提供一個涵蓋內容格式轉換、版本控制、數碼版權管理等的數碼資產管理解決方案。
Video Summary and Retrieval System This project comprises video summary and video object retrieval servers with system integration of video surveillance platform and a browser based client.	**視頻摘要和檢索系統** 這是一個提供視頻摘要和檢索伺服器的項目，包括與視頻監測平台及基於瀏覽器的用戶端的系統集成。

iPod Docking Station ⬇
iPod 儲存裝置站

ECE completed an Industry Collaborative Project (ICP) with Optek Electronics Company Limited, a Shenzhen-based IC solution provider for consumer electronics. They jointly developed an advanced multimedia audio codec SoC ASIC (OPT5256) to support multiple music format codec and audio effect post-processing and it is fully commercialized. Six companies are using the chip in their iPod docking products which have reached one million units. In a fiercely competitive market, the chip is not only cost-effective, but also provides features with differentiation.

企業與消費電子群組與 Optek 電子股份有限公司，一家位於深圳的消費電子集成電路解決方案供應商，完成了一個「業界合作項目」。雙方合作開發的先進多媒體音訊編解碼器系統級晶片（OPT5256），支援多個音樂格式轉碼器和音訊效果後處理，該晶片已全面商品化。現時已有六家公司在他們的iPod基座產品採用該晶片，數量超過一百萬部。在競爭激烈的市場中，該系統級晶片極具成本效益，而且提供了功能差異性的優點。

Focusing on the concept of using ICT to enhance healthcare service delivery for better efficiency, ECE developed a tele-health hub system and conducted a successful trial with nurses in a public hospital. Results showed that the system can meet the needs of community nurses who are the system's end-users and it can also meet the security requirements during application and deliver quality operational data. The trial was conducted under real hospital

為了利用資訊和通訊技術來改善醫療保健服務和提升效率，企業與消費電子群組開發出遠程保健中心系統，並且與一間公立醫院合作，讓社區護士試用該系統。測試結果反映系統的優點：系統符合最終使用者，即社區護士的需求；系統亦達到社區護士在應用時所需的安全要求，而且能夠提供高質素的操作數據。測試

Audio Codec Soc ASIC ↖
音訊編解碼器晶片

operation environment and it proved the value of using ICT in improving healthcare service.

ECE developed an e-learning total solution enabling schools to practise e-learning in either classrooms or outdoors, and also enabling publishers to distribute teaching materials to schools directly. This e-learning solution includes four major technology components: Learning Management System, Content Bridge, Android-based mobile e-learning device named PAL (Personal Assistant for e-Learning), and cross-platform e-learning client software, e.g., DRM-enabled e-reader. ECE has engaged 19 schools to participate in various e-learning programmes sponsored by the Education Bureau, as well as 68 schools in ASTRI e-reading trial programme.

In addition, ECE is collaborating with Mainland partners to support China Smart Multimedia Terminal Technology Association in setting up smart TV industrial standards. ECE is also helping major printing and electronic publishing companies and associations in Hong Kong, such as Hong Kong Publishing Federation, to increase their value and impact in the respective industrial value chains by using ECE's digital rights management for content protection.

在真實的醫院操作環境中進行，亦證明了資訊和通訊技術在改善醫療服務的價值。

企業與消費電子群組還開發了電子學習全面解決方案，讓學校無論在課堂上或課堂外都可以實踐電子學習，此方案又可以幫助出版商直接分發教學材料給學校。此電子學習解決方案包括四個主要技術元件：學習管理系統、內容橋、基於Android系統的移動電子學習設備「易學夥伴」（PAL）和跨平台電子學習用戶端軟體，例如啟用數碼版權管理的電子閱讀器。目前共有十九間學校參與了由教育局贊助及企業與消費電子群組支援的電子學習計劃，另有六十八間學校參與應科院的電子閱讀試驗計劃。
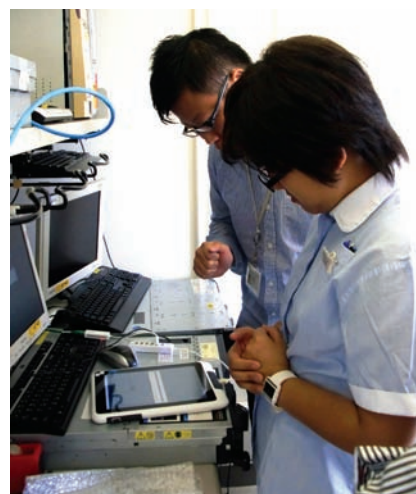
← Trial use of tele-health
system by hospital nurses
醫院護士試用遠程保健系統

↓ Tele-health Hub in Tablet
Form Factor
遠程保健中心的平板電腦

群組正與其在中國內地的夥伴緊密合作，為中國智能多媒體終端技術聯盟訂立智能電視工業標準。此外，群組又與本地主要印刷和電子出版公司，例如香港出版總會等合作，協助他們利用群組的數碼版權管理技術來加強內容保護，以增加其在各產業價值鏈中的價值和影響力。

Tele-health Hub
遠程保健中心

A device ideal for healthcare monitoring at home and anywhere.
此系統適用於在家或在任何地方進行健康監控。

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

Future Development
未來發展

ECE's future R&D direction can be summarized in the following areas.

Creating patents focusing on commercialization value

ECE's patent strategy is to establish a patent portfolio for new technologies with commercialization value. Besides creating patents on innovative technologies, the potentials of bringing in long-term revenue will also be considered. The Group has appointed a senior staff to take charge of creating and managing internal process, liaison with patent companies and exploring business opportunities.

Enterprise vertical markets

In addition to mass consumer markets such as set-top box and smart TV, ECE will focus on vertical markets such as e-learning, surveillance and tele-health.

Taking e-learning as example, ECE offers a full suite of e-learning solutions, including PAL, Open Research Platform Learning Management System and Content Bridge for seamless access to contents provided by multiple textbook providers. ECE also provides teaching and learning applications such as digital travel for teachers and students to experience mobile learning. The next step is to expand the e-learning scope to support inter-school activities through cloud service.

Video Summary and
Object Retrieval System
視頻摘要及檢索系統

企業與消費電子群組的未來發展方向包括以下幾方面。

以商業價值為取向的專利策略

企業與消費電子群組正建立其專利組合，其策略是將重點投放於具有商業價值的專利。除了要創造在技術上創新的專利，在商業方面，專利是否可以帶來長期收入將會是另一重點考慮。群組已委任一名高級員工專責建立和管理內部專利程序、與專利公司接洽，以及發掘商業機會。

企業垂直市場

除了消費電子市場，如機頂盒和智能電視等，企業與消費電子群組也將專注於企業垂直市場，如電子學習、 監控和遠程保健。

Students playing with PAL
學生在使用「易學夥伴」

以電子學習為例，企業與消費電子群組提供了一套完整的電子學習解決方案，包括電子學習設備「易學夥伴」、開放式研究平台學習管理系統、以及經由內容橋無縫接入多個教科書商的教科書內容。群組還提供教學與學習應用程式，例如讓教師和學生可以透過數碼遊蹤一嘗移動學習。群組下一步將會擴大電子學習範圍，以雲端服務支援校際間的活動。

Want to know more?
想認識更多？

Ultimate e-Book for e-Learning
適應電子教育的電子書

Total e-learning solutions open a new era of education.
全面電子學習解決方案開創教育新時代。

Android-based smart TV

Consumer electronics (CE) are getting smarter being able to have Apps run on them. To capture this smart CE trend, ECE will research and develop an enhanced smart CE OS framework, especially for the Mainland smart TV market. The framework will optimize the open source Android platform to run Android Apps, but with less memory and lower-end CPU required comparing with standard Google Android, thus providing a low-cost solution to meet general CE market needs.

Multimedia technology IP development

ECE will continue focusing on development of 2D to 3D video and image conversion, video post-processing and audio technologies such as spatial/virtual surround enhancement, microphone array and digital audio amplifier.

基於 Android 的智能電視

消費電子產品越來越趨向智能化，可以運行各種應用程式。為了把握這個新趨勢，企業與消費電子群組特別針對內地智能電視市場，研發增強版的智能操作系統框架。此框架將優化開源的Android平台，運行Android相容的應用程式，相比於谷歌Android，需要較少的記憶體和更低端的處理器。群組希望藉此能提供低成本的解決方案，以滿足消費電子市場的需要。

多媒體技術智識產權的發展

企業與消費電子群組將繼續專注發展幾個重點技術領域，包括二維到三維視頻和圖像轉換、視頻後置處理及音訊技術如空間/虛擬環繞聲增強、麥克風陣列和數碼音訊放大器等。

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企業與消費電子群組
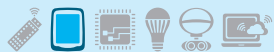
Project Highlights
研發項目

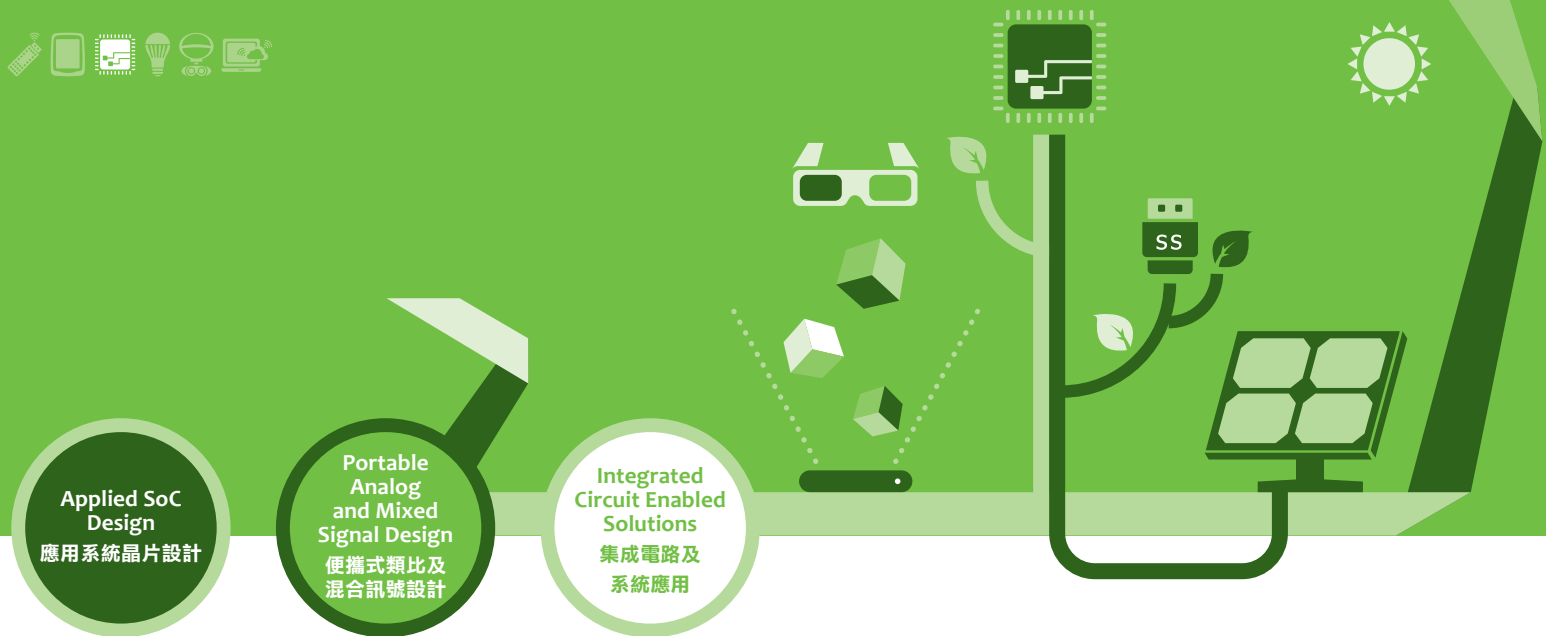|	Project 項目	Duration 時期
1 Ⓟ	P2P IPTV Quality of Experience 點對點網絡電視的質量體驗系統	Mar 2010 – Jul 2011 二零一零年三月至二零一一年七月
2 Ⓟ	Core Technology for Multimedia Signal Processing and Productization, Intelligent Embedded Multimedia Information Processing Platform 多媒體訊號處理核心技術及產業化，嵌入式智能多媒体信息處理平台	Mar 2010 – Dec 2011 二零一零年三月至二零一一年十二月
3 Ⓟ	Multi-standard H.264/AVS/MPEG2 Low- cost High-performance Full HD Video Decoder SoC 多標準H.264/AVS/MPEG2低成本高性能全高清視頻解碼器系統晶片	Jun 2009 – Sep 2011 二零零九年六月至二零一一年九月
4 Ⓟ	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
5 Ⓟ	Open Research Platform for Learning Management System 學習管理系統的開放式研究平台	Dec 2010 – Nov 2012 二零一零年十二月至二零一二年十一月
6 Ⓟ	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
7 Ⓟ	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
8 Ⓟ	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
9 Ⓟ	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
10 Ⓟ	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
11 Ⓟ	Mobile Social Networking Framework 移動社交網絡框架	May 2010 – Aug 2011 二零一零年五月至二零一一年八月
12 Ⓟ	Tele-health 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
13 Ⓟ	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
14 Ⓟ	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
15 Ⓘ	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
16 Ⓘ	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

		Project 項目	Duration 時期
17	S	Tele-health Platform 遠程健康照護平台	Mar – Aug 2011 二零一一年三月至八月
18	S	Proximity-based Biometric Identification System 近距離生物特徵識別系統	May – Nov 2011 二零一一年五月至十一月
19	I	90 nm CMOS High-end, High-definition Multimedia SoC ASIC Chip 90納米CMOS高端高清多媒體系統級專用集成電路	Mar 2010 – Mar 2012 二零一零年三月至二零一二年三月
20	I	e-Schoolbag 電子書包	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 Industry Collaborative
Project
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 IC Design (ICD) Group has been an integral part of ASTRI since the institute was established in 2000. Since then, ICD has evolved into a key driving force behind integrated circuit design and applications in Hong Kong and the Pearl River Delta Region. Its expertise includes system architecture, analog and mixed signal designs, SoC designs and IC-enabled system solutions.

ICD has obtained many patents with the technologies it developed
集成電路設計群組研發的技術曾獲發多項專利

自應科院於2000年成立以來，集成電路設計群組一直是應科院的一個重要組成部份。集成電路設計群組其後續漸發展成為一股推動香港及珠江三角洲集成電路設計及應用發展的動力。群組的專業領域包括系統架構、模擬及混合訊號設計、系統級晶片設計，以及集成電路系統解決方案。

群組與本地業界及大學緊密合作，集中發展以下五個技術和應用領域：綠色能源、傳感器和通訊，以及存儲器和圖像處理。在過去一年，群組成功研發出一系列新穎產品，包括固態硬盤控制器、USB 3.0 控制器、LED驅動器、二維至三維實時視頻轉換器、MEMS傳感器，以及應用於微型投影儀的晶片。

Working closely with local industries and universities, the Group focuses its efforts on five technology and application areas: power management, sensors and communication, as well as storage and imaging. During the year, ICD developed a number of exciting products including solid state disk controllers, USB 3.0 controllers, LED drivers, real-time 2D to 3D video converters, MEMS sensors and pico-projector ICs.

Trophies and awards won by ICD this year
集成電路設計群組在本年度贏得的獎座及榮譽

What is your dream invention?
你的理想發明是什麼？

I believe some kinds of sensing devices could be
developed to facilitate people's lifestyle.
我相信透過開發某類傳感器，可以令人類的生活更美好。

Mr. Bryce Yau 游學武先生
Principal Engineer 主任工程師

What is your dream invention?
你的理想發明是什麼？

I hope that in future a realistic holographic display
will be easily available.
我期望可發明一個像真度極高而能普及的全息顯示器。

Mr. Alan Cheung 張偉倫先生
R&D Director 研發總監

"We are
confident that the edge
of ASTRI in R&D will
help Megalogic scale
new heights.
我們深信應科院的研發
實力能夠幫助宏創高科
更上一層樓。"

Mr. Stapler Li 李桂聰先生
Chief Executive Officer,
Megalogic Technology Holdings Ltd.
宏創高科集團有限公司 行政總裁

AC-DC LED Driver Lighting Solution
AC-DC LED照明方案

AC-DC LED Lighting has become popular because it is energy saving and environmentally friendly.
AC-DC LED照明，由於既節能又環保，越來越受到歡迎。

In the coming year, ICD will continue pushing its technologies on several fronts, including developing transceiver ICs used in 10G and 25G optical communication systems, video frame rate doubler ICs, AC-DC LED drivers, video quality enhancement ICs and wireless body sensor network ICs.

ICD filed 18 patent applications and was granted 11 during the year. On the commercialization front, the Group signed 18 contracts for technology transfer and received HK$10.3 million from the industry.

未來數月，群組將繼續發展幾個技術項目，包括研發中的10G及25G光通訊系統集成電路收發器、運動補償畫面插幀技術、AC-DC LED驅動器、增強視頻質量的晶片，以及無線人體傳感器網絡晶片。

在審計年度內，群組申請了18項新專利，另外通過審批的專利達11項。在市場化方面，群組簽署了18份技術轉移合約，從業界取得收入一千零三十萬港元。

AC-DC LED Solid State
Lighting Driver
AC-DC LED 驅動器

= 2 number 數目　　$ = 2 million(HK$) 百萬(港元)
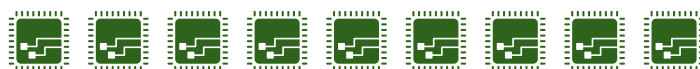
Patents Filed
專利申請數目　　**18**

Patents Granted
獲批專利數目　　**11**

Contracts Signed
與業界簽訂合約數目　　18

Income Received
from Industry*
業界收入*　　10.3

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

Patents Filed 專利申請

Technological Areas	涉及科技範疇
Data Converter	數據轉換器
Frame Rate Conversion	幀速率轉換
LED Lighting	LED照明
Mobile TV	移動電視
Pico Projector	微型投影機
Power Management	電源管理

Patents Granted 獲批專利

Technological Areas	涉及科技範疇
Data Converter	數據轉換器
ESD Protection	防靜電保護
Home Appliance	家電
LED Lighting	LED 照明
Optical Sensor	光學傳感器
Phase Lock System	相位鎖定系統
Power Management	電源管理

IC Design Group
集成電路設計群組
Innovations
技術突破

Want to know more?
想認識更多？

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

Enjoy 3D theatre at home anytime by instantly changing 2D videos from any sources into high quality 3D.
即時將任何來源的2D影像轉換成效果逼真的3D影像，安坐家中隨時享受3D影院樂趣。

應用系統晶片設計

在應用系統晶片設計方面，群組一直在設計、實施和測試上與客戶緊密合作。主要研發領域包括安全數據存儲、USB 3.0控制器以及圖像處理。

Applied SoC Design (ASD)

ASD has been working closely with customers on designing, implementing and verifying products in several key areas including secure solid state storage, USB 3.0 controller and image processing.

The world's first real-time conversion technology from 2D to 3D images
全球首創將2D影像實時轉換成3D影像的轉換器技術

In the past year, the team's breakthroughs in image processing and storage technologies brought new experience of quality viewing and secure digital data storage to the public.

The team's image processing technologies offer the most natural and realistic 3D visual sensation by instantly converting 2D contents into stunning 3D scenery. In addition, the

過去一年，群組在圖像處理以及存儲技術上的突破，為公眾帶來了優質觀賞及安全數據存儲的新體驗。

群組的圖像處理技術能夠將任何二維內容實時轉換為效果震撼的三維畫面，提供最自然逼真的三維視覺享受。此外，先進的運動補償畫面插幀技術可確保電視及電影顯示高速畫面時效果流暢自如。這些技術不僅可應用於電視和投影機，也適用於便攜式電子產品，如智能手機、平板電腦及數碼閱讀器等。

smoothness of fast-motion TV and cinema screen is guaranteed by state-of-the-art frame rate conversion techniques. These technologies can be applied to TVs and projectors. They are also suitable for portable electronics such as smart phones, tablets and e-readers, etc.

ASD's dedication 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 notebooks and personal computers. ASD storage solutions are equipped with USB 3.0 interface, which is 10 times faster than USB 2.0. They also include hardware encryption engines to protect user data against unauthorized access.

Portable Analog and Mixed Signal Design (PAD)

PAD made significant progress in technology development during the year. While staying focused on core analog technologies, it expanded IP portfolios to support a number of new industrial applications.

The team developed AC-DC and DC-AC conversion technologies targeting green and renewable energy markets. A number of analog to digital converters (ADC) ranging from a 12-bit ultra-low power ADC to a 20-bit high-resolution Sigma Delta ADC were also developed for portable electronics applications. In addition, PAD delivered design of ultra-low energy data converters for low-power signal processing applications for both consumer and communication use.

Pico-projectors are rapidly gaining popularity in mobile applications. PAD developed a cost-effective LCoS imager IC, offering a high-performance, low-power and cost-effective solution to manufacturers and enhancing market development.

Night vision applications have been greatly enhanced by the infrared sensor read-out IC (ROIC) used in un-cooled bolometers developed by PAD. They are useful for many applications such as navigational aid for cars at night. PAD is developing a ROIC platform for high-resolution micro-bolometers to be used in un-cooled infrared cameras and imaging equipment.

群組致力開發存儲技術，為廠商製造出傳輸速率極快、可靠及安全性高的存儲方案，包括隨身碟、便攜式硬盤，以及在超薄型手提電腦及個人電腦使用的固態硬盤。群組的存儲技術都配備了USB 3.0接口，比USB 2.0快十倍，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

在便攜式類比及混合訊號設計方面，群組在過去一年取得重大的進展。除了致力發展核心模擬技術，群組積極擴展其知識產權組合方案，以支持一些新的工業應用。

群組針對綠色及可再生能源市場開發AC-DC和DC-AC轉換技術。在便攜電子設備應用方面，群組開發的創新產品包括由12位超低功耗的模擬到數碼轉換器（ADC），到20位高解析度三角積分型ADC等。此外，群組設計的超低功耗數據轉換器，適合消費電子和通訊器材的低功耗應用。

ASD's Key Areas
應用系統晶片設計主要研發領域

● **Secure Solid State Storage**
安全數據存儲

● **USB 3.0 Controller**
USB 3.0控制器

● **Image Processing**
圖像處理

AC-DC Flyback LED Driver with built in protection features for over voltage and over current, ensuring safety and reliability for LED lighting applications
交流─直流反激式LED驅動器的內置保護功能如過壓及過流保護，為LED照明應用提供了安全可靠的解決方案

Want to know more?
想認識更多？

AC-DC LED Driver
AC-DC LED驅動器

AC-DC LED Driver for widespread deployment of solid state lighting.
AC-DC LED驅動器推動固態照明的廣泛應用。

ICES's Key Areas
集成電路及系統應用主要研發
領域

### Optical Communications
光纖通訊

Green Energy
綠色能源

In the electrostatic discharge (ESD) area, PAD's device and modelling team delivered ESD protection IPs with 8KV HBM performance.

Finally, for people who like entertainment on-the-move, PAD developed a multi-mode mobile TV demodulator and media processor SoC for mobile TV applications.

Integrated Circuit Enabled Solutions (ICES)

During the year, ICES focused on developing IC-enabled solutions for two major areas of applications: optical communications and green energy.

ICES assembled a group of talented engineers to work on key IC components in 10G and 25G optical transceivers, as well as an 8-bit time-interleaved 64GS/s ADC used in coherent transmissions. The 8-bit 64GS/s ADC features a 16GHz on-chip PLL (phase locked logic) as well as an innovative time-interleaved architecture distributing the sampling load to 128 sub-ADCs each operating at 500 Mega-samples per second.

Micro-inverter for solar
power generation system
用於太陽能發電系統的
微型逆變器
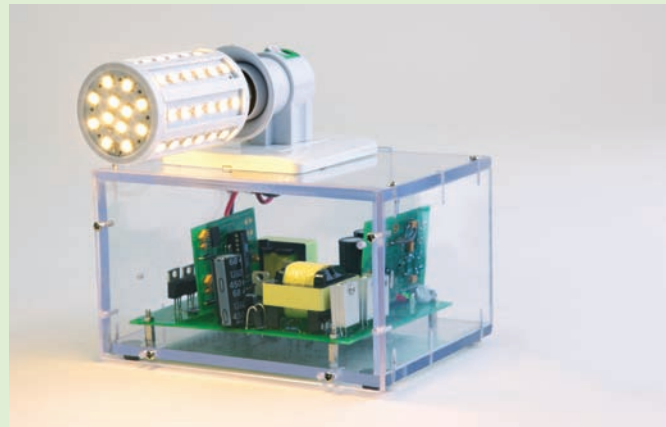
On green energy, ICES completed detailed research on microinverters used in solar power generation. The microinverters contain maximum power point tracking (MPPT) circuits capable of extracting maximum power from solar panels under all lighting conditions. By pairing one microinverter with each panel, the common problem of power lost caused by shading of solar panels is greatly reduced.

ICES also started working on variable frequency motor controllers which can save considerable energy in home appliances such as refrigerators, air-conditioners and washing machines.

隨著微型投影機在移動領域的應用越趨普及，群組開發出一個具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，有助推動微型投影機市場的成功發展。

群組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，大大地加強了夜視領域的應用。這些器件的用途非常廣泛，例如支援汽車夜間導航。群組現正努力開發一個高分辨率微測輻射熱計的ROIC平台，供非冷卻紅外線照相機和成像設備應用。

在靜電放電方面，負責器件和建模的團隊成功交付了具備有8KV HBM性能的靜電放電保護智識產權。

最後，群組為喜愛移動娛樂人士，開發出多模移動電視應用的基帶和多媒體處理器SoC。

集成電路及系統應用

在集成電路及系統應用方面，群組在過去一年集中為兩個領域提供解決方案：光纖通訊和綠色能源。

在一群優秀的工程師努力下，群組開發10G和25G光纖收發器，以及用於相連傳輸系統內的64GS/s 8位元時間交錯模擬數碼轉換器的關鍵IC部件。64GS/s 8位元轉換器內含16GHz鎖相環電路以及創新的時間交錯架構，將取樣工作分配予128個以每秒500萬樣點數運作的子模數轉換器。

在綠色能源方面，群組完成對太陽能微型逆變器的詳細研究。微型逆變器內設有「最大功率跟蹤」電路，能夠在所有光度下提取太陽能電池板的最大可用功率。太陽能電池板受遮蔽而導致的功率損失是一個非常普遍的問題，因此在每塊太陽能板上配上一個微逆變器便能提升整個系統的輸出。

群組已開始進行變頻電機控制器的研發工作，這是一種用於冰箱、空調和洗衣機等家電的高效節能技術。

Commercialization
市場化

Want to know more?
想認識更多？

USB 3.0 Application Processor
USB 3.0 應用處理器

USB 3.0 Application Processor for storage, hub or display applications.
用於儲存、集線器或顯示的USB 3.0 應用處理器 。

USB 3.0 storage device
USB 3.0儲存器

Applied SoC Design (ASD)

The 2D to 3D video real-time conversion technology was licensed to a U.S. partner for embedding into a conversion box, which is now available in U.S. and European markets. This technology can be used in a wide range of applications including TV broadcasting, movie conversion, education, medical imaging and digital signage, etc.

Extensive R&D in storage technologies won for ASD a number of customer contracts. A total of five agreements were signed with customers leveraging ASD's expertise in solid state disk (SSD) and USB 3.0 technologies.

ASD also completed an Industry Collaborative Project (ICP) with Velosti Technology Limited, a U.S. company based in Silicon Valley, resulting in mass production of USB 3.0 based storage devices.

應用系統晶片設計

二維至三維視頻實時轉換技術，已授權予一家在美國的合作夥伴來生產轉換器，現正於歐美市場發售。此技術的用途十分廣泛，包括電視廣播、電影轉換、教學、醫療影像及電子廣告牌等等。

群組憑著在存儲技術上豐富的研發經驗，贏得客戶信任。年內，群組與客戶簽訂了五份合約，客戶將使用群組開發的固態硬盤及USB 3.0技術。

群組與在美國矽谷的 Velosti Technologies Limited，合作完成了一項「業界合作項目」，該客戶已開始大規模生產USB 3.0儲存器。

> "The attractiveness of ICP comes from the fact it allows resource sharing which leverages strengths between partners. The ICP with ASTRI not only fulfilled my project budget and design requirements, it also helped me expand my market reach to the Mainland.
> 這個計劃（業界合作項目）的吸引之處，在於能分享彼此的資源，互補長短。這不但能滿足我在成本和人才方面的需要，更有利我日後拓展內地市場。"
>
> Dr. Patrick Hung
> 洪小瑩博士
> Velosti Founder & President
> Velosti 創辦人及總裁

Dimmable LED Lamp
可調節光暗LED燈具

LED lamps developed by ASTRI differ from
those in the market because they come with
a dimming function for energy saving.
由應科院研發的LED燈具跟市面上的不同，
因為它們可調節光暗，更加省電。

Dimmable LED Light Module ↑
可調節光暗的LED光源模組

Portable Analog and Mixed Signal Design (PAD)

Solid state lighting technology was licensed to at least four local IC
design houses with monthly production of more than 100,000 units.

Analog-to-digital converter technologies secured several licensing
and contract service agreements. Commercial production of PAD's
AC/DC solution by a leading Hong Kong company is in full swing. Also,
ultra-low power ADC technologies were licensed to design houses for
applications in consumer, computing and communication products.

In the pico-projector area, PAD delivered the LCoS imager chip to a
major manufacturer. The design was the first of its kind in Hong Kong
and the Mainland. So far, PAD has signed one licensing agreement
with a leading LCoS supplier and one contract research agreement
with another customer.

Integrated Circuit Enabled Solutions (ICES)

A tier-one company sponsored ICES's effort in optical communication
by providing free fabrication of ICs implemented with SiGe BiCMOS
technology. Meanwhile, ICES is proactively exploring collaboration
opportunities with partners in optical communication and green
energy industries.

便攜式類比及混合訊號設計

固態照明技術已授權給超過四家本地集成電路
設計公司使用，每月生產量超過十萬台。

群組為模擬數碼轉換器技術取得幾份技術授權
及研發服務合約。其中一家領先的香港公司已
大規模生產模數轉換解決方案。此外，群組的
超低功耗模數轉換技術已授權予幾家設計公
司，將技術應用於消費、電腦和通訊產品。

在微型投影機方面，群組為一家大型製造商提
供矽基液晶成像晶片，其設計在香港和中國內
地屬於首創。群組目前已就該技術與一個領先
的矽基液晶供應商簽訂了技術授權合約，與另
一客戶又簽署了合約研究項目。

LED light bulbs for Belisha Beacon Lamp ↑
給交通指示燈使用的LED燈泡

集成電路及系統應用

群組成功取得一家一線大廠商的贊助，為其免
費製造高速光纖通訊晶片。群組正積極尋求在
光纖通訊和綠色能源領域的企業合作夥伴。

Future Development
未來發展

Applied SoC Design (ASD)

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

In imaging technology, ASD will focus on super resolution, auto-stereoscopy and holography to keep pace with future generations of digital displays in home entertainment and portable consumer electronics.

In the storage area, ASD will aim at delivering novel and environmentally-friendly SSD-based solutions to meet the increasing demand for highly reliable and ultra-fast data transfers for enterprises and cloud computing storage servers.

In the health equipment area, ASD is working on a new technology: acoustic signal processing. Although this technology has been used quite extensively in consumer electronics, it is rarely applied in the medical domain. However, a digital stethoscope equipped with noise cancellation has been proved beneficial to both healthcare personnel and patients. ASD will dedicate research efforts to produce advanced equipment for healthcare use.

應用系統晶片設計

憑藉在圖像和存儲技術的專長，以及成功商品化的堅實基礎，群組將繼續擴大業務覆蓋及應用範圍。

在圖像處理方面，群組將重點發展超解析度技術、立體感自動化技術及全息圖技術，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。

在存儲技術方面，群組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高可靠性和超高速數據傳輸日益增長的需求。

在醫療器材方面，群組正在研發一項名為「聲音訊號處理」的新技術。聲音訊號處理常被採用於消費電子產品，但在醫療領域上的應用至今還未普及，但是有研究證明，配備噪音消除功能的數碼聽診器對醫護人員和患者都會帶來好處。群組將致力研發醫療保健用途的先進儀器。

Want to know more?
想認識更多？
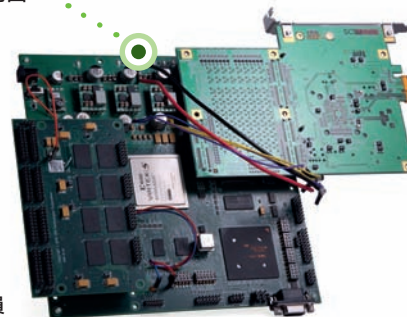
High Performance USB 3.0
Solid State Disk Controller
高性能USB 3.0固態硬盤
控制器

PAD's Key Areas
便攜式類比及混合訊號設計
主要研發領域

RFID/NFC
射頻識別與近場通訊

Wireless Body Sensor
Network
無線人體傳感器網絡

Direct Digital Synthesis
數碼頻率合成

Portable Analog and Mixed Signal Design (PAD)

PAD researchers will focus on three main areas. The first one is radio frequency identification (RFID) and near-field communication (NFC). RFID/NFC is an emerging technology expected to have great impact on logistics operation and mobile payments. PAD will also use its expertise in low-power analog design to develop innovative solutions.

The second research area is wireless body sensor network (WBSN). Collaborating with Imperial College London, PAD will develop WBSN solutions for patient monitoring and medical parametric tracking through the Internet. WBSN can help realize tele-health and make it part of our daily life.

PAD will also research on direct digital synthesis focusing on developing a group of high-speed analog and digital IPs for implementing frequency synthesis for wireless communications, radar and antenna array applications.

Integrated Circuit Enabled Solutions (ICES)

ICES will continue focusing on optical communications and green energy. It will work on expanding the optical communication IC portfolio to include 25G clock and data recovery units which are critical signal recovery and conditioning circuits in optical and electronic transceivers. It will also continue researching on variable frequency controllers for AC motors.

便攜式類比及混合訊號設計

在便攜式類比及混合訊號設計方面,群組將集中發展以下三個領域。第一是射頻識別與近場通訊,這種新興技術,對物流和移動付款將會帶來極大影響。群組將利用其在低功率模擬設計的專長,開發創新的解決方案。

群組的第二個發展領域是無線人體傳感器網絡。群組正與倫敦帝國學院合作,開發通過互聯網監察病人和跟踪醫療參數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,使之成為我們日常生活的一部分。

第三個發展領域是數碼頻率合成:該項目將開發一組高速模擬和數碼頻率合成技術和知識產權,應用在無線通訊、雷達和天線陣列。

集成電路及系統應用

在集成電路及系統應用方面,群組將繼續集中研發光纖通訊和綠色能源技術。群組將擴大光纖通訊集成電路產品組合,包括25G的時鐘和數據恢復單元(CDR),它們是光纖通訊收發器內重要的訊號恢復和調理電路。群組也將繼續研究應用於交流電動機的變頻控制器。

IC Design Group
集成電路設計群組

Project Highlights
研發項目

77

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

|		Project 項目	Duration 時期
		Applied SoC Design 應用系統晶片設計	
1	**I**	Multi-role Configurable USB 3.0 Application Processor 多角色可配置USB 3.0應用處理器	May 2010 – Dec 2011 二零一零年五月至二零一一年十二月
2	**P**	LCD TV Display Enhancement Controller 液晶電視顯示增控制器	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 USB 3.0 USB 3.0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	**I**	Mobile Entertainment Processor 移動娛樂處理器	Aug 2011 – Sep 2012 二零一一年八月至二零一二年九月
5	**P**	Stereoscopic Image Signal Processor 立體圖像訊號處理器	Mar 2012 – Oct 2013 二零一二年三月至二零一三年十月
		Portable Analog and Mixed Signal Design 便攜式類比及混合訊號設計	
6	**P**	ESD Design & Device Modelling ESD設計與器件模型	Jul 2009 – Mar 2011 二零零九年七月至二零一一年三月
7	**P**	Ultra-low Energy Analog-to-Digital Converter 超低功耗模數轉換器	Feb 2010 – Aug 2011 二零一零年二月至二零一一年八月
8	**P**	Integrated LCoS Imager IP for Pico-projectors 應用於微型投影儀的矽基液晶集成影像晶片的IP開發	Mar 2010 – Nov 2011 二零一零年三月至二零一一年十一月
9	**P**	Multi-mode Mobile TV Baseband and Media Processor SoC 多標準移動數碼電視解調器及多媒體處理器系統晶片	Jun 2010 – Dec 2012 二零一零年六月至二零一二年十二月
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 – May 2012 二零一零年五月至二零一二年五月
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	**S**	High-speed and Agile Direct Digital Synthesizer 高速捷變的直接數碼綜合器	Sep 2011 – Mar 2012 二零一一年九月至二零一二年三月
14	**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
		Integrated Circuit Enabled Solutions 集成電路及系統應用	
15	**P**	High-speed Integrated Circuits for Optical Fibre Communication 光纖通訊適用的高速集成電路	Nov 2010 – Nov 2012 二零一零年十一月至二零一二年十一月

P Platform Project
平台項目

S Seed Project
種子項目

I Industry Collaborative Project
業界合作項目

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

LED Technologies
LED技術

Packaging and Sensing
構裝與感測

Green Energy
環保能源
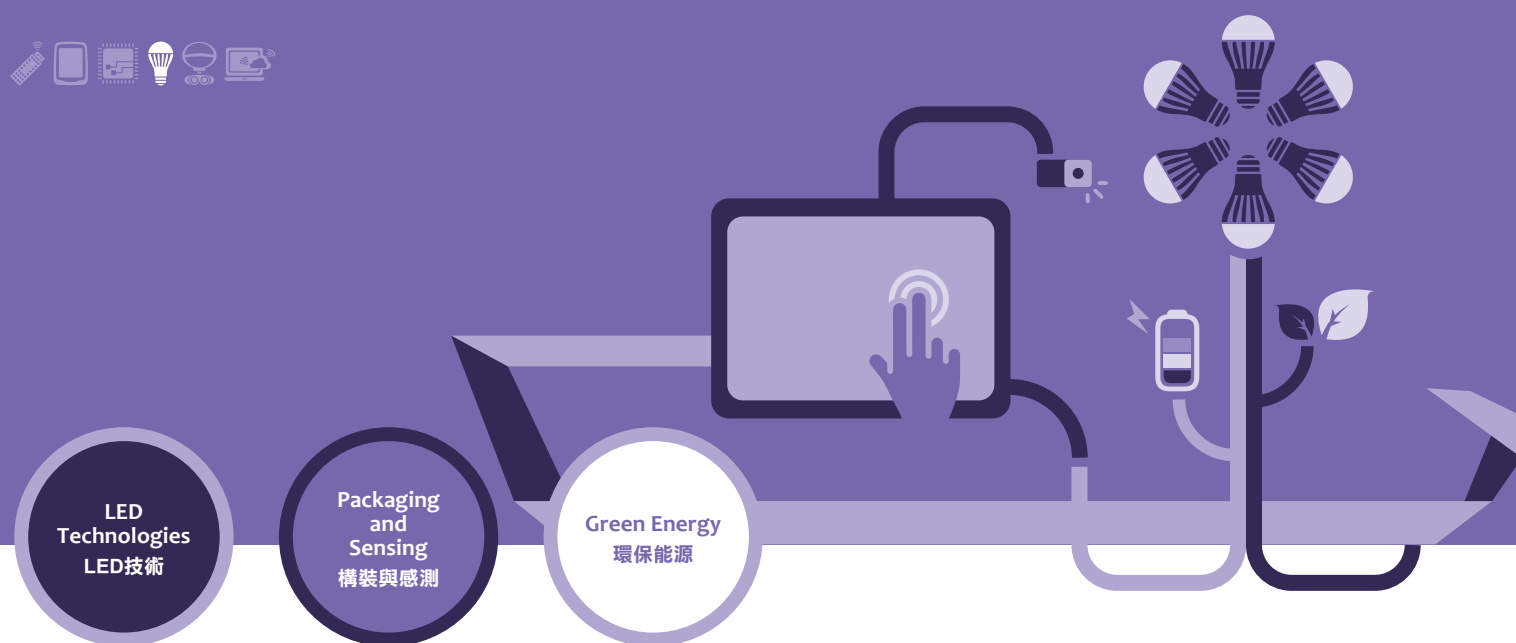
Since establishment in 2005, the Material & Packaging Technologies (MPT) Group has been focusing on developing high value, next generation technologies and products in the form of devices, components, modules and system integration that are differentiated mainly by material and packaging technologies.

材料與構裝技術群組自二零零五年成立至今，一直致力研發具有高附加值的新一代技術和產品，包括以先進材料和構裝技術開發的器件、元件、模組和系統。

通過研發以顧客為導向的技術及產品方案，群組為打造香港和中國內地成為全世界資訊及通訊技術行業所需的新一代關鍵元件、特別器件、全功能系統的設計和製造中心奠定了堅實的基礎。

A researcher testing and analyzing high capacity anode materials for lithium-ion batteries
研究員測量及分析用於鋰離子電池的高容量陽極材料

By developing customer-focused technologies and product solutions, MPT has laid a solid foundation for Hong Kong and the Mainland to become a major centre for designing and manufacturing next generation key components, unique devices and fully functional systems for worldwide information and communication technology industries.
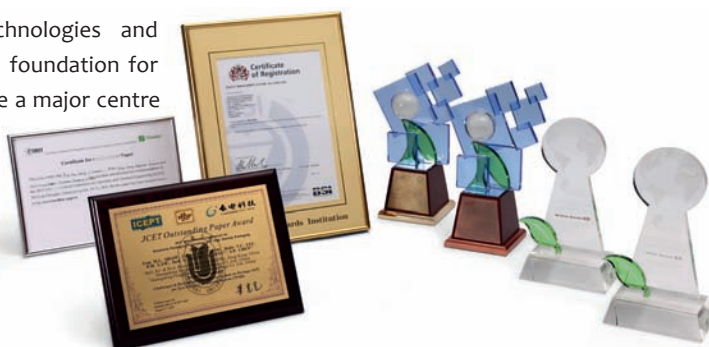
Trophies and awards won by MPT this year
材料與構裝技術群組在本年度贏得的獎座及榮譽

What is your dream invention?
你的理想發明是什麼？

My dream invention is a universal communicator which can break all language barriers and draw people closer together.
我的理想發明是一部全能翻譯器，可以打破所有語言障礙，拉近人與人之間的距離。

Dr. Crystal Fok 霍露明博士
Manager 經理

Who is your best working partner?
誰是你工作上的最佳拍擋？

I found that my best working partner is my cell phone because it helps me stay connected with people.
我發現手機是我的最佳工作夥伴，透過它，我可以時刻與人保持聯繫。

Mr. Ryan Chung 鍾沛璟先生
Director 總監

"ASTRI's technologies have really helped us boost our market share.
應科院的技術確實能夠幫助我們成功進佔市場。"

Mr. Shen Zhihua 諶志華先生
General Manager,
Shenzhen Haiya Technology Co., Ltd.
深圳市海亞科技發展有限公司　總經理

Auto-focus Compact Camera Module
微型相機的自動對焦模組

The Auto-focus Compact Camera Module is the world's smallest actuator for cameras of 1.3M, 3M and 5M pixels, keeping the size of the product small while maintaining high quality images and videos.

全球最小的微型相機自動對焦模組適用於130萬、3百萬和5百萬像素的相機，令產品更輕巧之餘，又能維持高質量的影像及視像畫面。

MPT made remarkable achievements in patents filed and granted, technology transfers and income from industry. The Group filed 62 patents and was granted 58 during the year. These patented technologies were licensed 21 times to companies in Hong Kong and the Mainland and turned into applications. In commercialization, MPT signed 26 contracts with 24 companies receiving HK$19.5 million from industry, a more than 32 per cent increase from last year.

群組在專利申請、獲批專利、技術轉移以及從業界所得收入幾方面均成績斐然。群組在本年度共申請了六十二項專利，獲批專利共五十八項，該些專利在是年內透過二十一次技術授權給香港和中國內地的公司加以應用。在商業化方面，群組與二十四家公司簽署了二十六份技術轉移合約，從業界獲取收入達一千九百五十萬港元，比去年增長超過百分之三十二。

↑ The world's smallest Auto-focus Camera Module for portable consumer electronics measures only 6.84x6.62x5.95mm^3
用於便攜式消費電子產品，全球最小的相機自動對焦模組，體積只有 6.84x6.62x5.95mm^3

= 5 number 數目   = 2 million(HK$) 百萬(港元)

Patents Filed 專利申請數目	62
Patents Granted 獲批專利數目	58
Contracts Signed 與業界簽訂合約數目	26
Income Received from Industry* 業界收入*	19.5
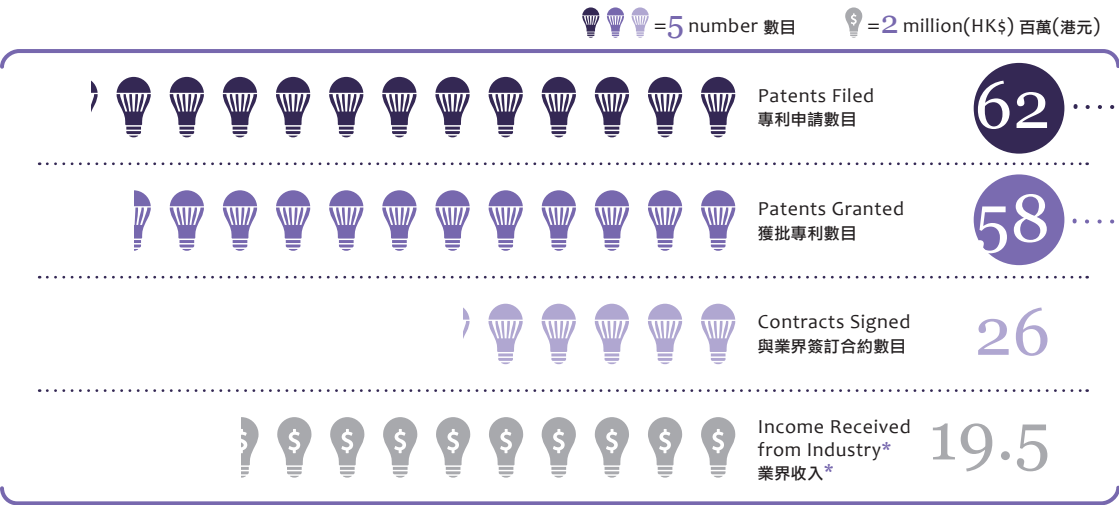
*Including cash and in-kind contribution 包括現金及物資資助

Patents Granted 獲批專利

Technological Areas	涉及科技範疇
LED Chip and Packaging	LED晶片與構裝
LED Lighting Applications	LED照明應用
LED Lighting Control	LED照明控制
Large Display System	大尺寸顯示應用平台
3D Packaging	三維構裝
System-in-Package (SiP)	系統級構裝
Printed Electronics	噴印電子
Compact Camera Modules	微型相機模組

Patents Filed 專利申請

Technological Areas	涉及科技範疇
LED Chip and Packaging	LED晶片與構裝
LED Lighting Applications	LED照明應用
LED Lighting Control	LED照明控制
Pico-projector Platform	微型投影顯示平台
Large Display Platform	大尺寸顯示應用平台
System-in-Package (SiP)	系統級構裝
3D Packaging	三維構裝
Healthcare Electronics	醫療保健電子
Printed Electronics	噴印電子
Compact Camera Modules	微型相機模組
Green Energy	環保能源

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

Innovations
技術突破

Want to know more?
想認識更多？

3D Mini-projector
微型三維投影機

3D Dual-LCoS Mini-projector provides users with convenience to enjoy 3D movies or 3D video games anywhere, anytime.
3D雙LCoS微型投影機讓用家可隨時隨地放映3D電影或玩3D遊戲。

3D Mini-projector ⬇
微型三維投影機

LED Technologies

The prototype of the world's first compact 3D dual-LCoS mini-projector was developed and showcased at the Consumer Electronics Show (CES) 2012 in Las Vegas. This technology received the Gold Award (Green, Healthy and Creative Living) in the Best Lifestyle category at the Hong Kong ICT Awards 2012.

Gallium nitride-based (GaN) vertical LED devices, including epitaxial structure design, LED device design, fabrication and characterisation, were developed. This is a novel process to entirely replace sapphire from

LED技術

群組研製出全球首台微型三維投影機的產品原型，並於美國拉斯維加斯舉行的2012年消費電子展上向業界展示產品技術。該投影機在二零一二年香港資訊及通訊科技獎中榮獲「最佳生活時尚獎」的金獎。

此外群組致力於鎵氮（GaN）LED垂直結構元器件的研發，包括外延結構設計、LED元器件設計、製作和特性分析。目前已經成功開發出一種新穎的LED技術，以金屬襯底或矽基襯底，取代鎵氮LED晶片原本的藍寶石襯底。在高良率要求的工業量產規模下，可藉由此技術，達成性能優越的高功率鎵氮垂直結構LED元件的製造。群組憑該技術獲得十一項專利，另有六項專利申請在審理中。

GaN-based LED devices with a new metal-based or silicon-based substrate, enabling production of high-power, vertical LED devices with higher yield comparing with alternative technologies. A total of 11 patents were granted and six applications are pending.

The heat ventilation technology "birdcage" solves the heat dissipation issue in 50W MR16 replacement lamp providing 500lm output in 8.5W power consumption. The optical technology's innovative and yet simple design not only reshapes the LED forward light into omnidirectional emission, but also provides an efficient and low-cost replacement solution for 60W incandescent light bulb. In total, 11 patents were granted with other four in application for this technology.

↑ With wireless lighting control technology, the On/Off status of lights, dimming and colour temperature changing effects can be controlled by smart devices such as mobile phones and tablets
有了無線照明控制技術，智能設備如手機及平板電腦等可用來開關燈、調光及控制色溫度變化

MPT developed LED wireless lighting control using ZigBee and microwave sensor module, allowing digital control of lighting in different scenarios. Two patent applications were filed in the U.S.

The Group also developed low-cost optical multi-touch technology with novel optical structure to support multiple and simultaneous touch inputs. It supports display size of up to 120 inches. Six patent applications were filed in the U.S. for this technology.

Meanwhile, MPT also developed an audience analysis platform using face detection and recognition technology to acquire information such as gender, age and dwelling time. Data collected can be used to enhance advertising effect on target audience. One patent application was filed in the U.S. for this technology.

「鳥籠」熱對流技術為50W替代型燈具解決了散熱問題，並在8.5W的功耗中達到500lm的光通量。群組又運用創新而簡潔的光學設計，將LED的方向性光源特性轉變為全方位發光，為60W以上的白熾燈泡提供了有效和低成本的替代方案。這兩項技術共獲得十一項發明專利，另有四項專利申請在審理中。

群組透過附有微波感測功能的LED無線照明控制模組，開發出無線照明控制，讓用家可以利用數碼控制來調校出配合不同情景的照明效果。群組就有關技術在美國已提交了兩項專利申請。

另外群組研發了低成本的創新光學多點觸控技術，容許多人同時輸入，此技術可支持大至120寸之顯示屏，六項美國專利申請在審理中。

群組還開發了基於人臉檢測和識別技術的觀眾分析技術平台，收集包括年齡、性別和觀看時間等重要信息。收集所得資料可用於加強對目標觀眾的廣告效果，一項相關美國專利申請在審理中。

↓ Intelligent Public Information Display provides viewers with real-time and interactive messaging experience
智能公共顯示屏讓觀眾體驗實時的互動信息顯示

Want to know more?
想認識更多？

Intelligent Audience Analysis System
智能觀眾分析系統

ASTRI combines its Intelligent Audience Analysis System with interactive display technology to form an intelligent display platform for applications such as intelligent public information display.
應科院將智能觀眾分析系統與互動式顯示技術相結合，開發出智能顯示技術平台，可應用於智能公共顯示屏。

Want to know more?
想認識更多？

Tyre Pressure Monitoring System
輪胎壓力監測系統

The Tyre Pressure Monitoring System reports real-time tyre pressure and temperature information to drivers alerting them of abnormal status.
輪胎壓力監測系統實時向駕駛者報告輪胎壓力和溫度等信息，讓駕駛者即時察覺到輪胎的異常情況。

Packaging and Sensing Technologies

A new version of the fully functional Tyre Pressure Monitoring System embedded with a system-in-package (SiP) module (integrating MCU, RF and MEMS chips), an antenna and antenna network was developed and installed on an electric bus for field test. MPT filed 14 patent applications for the technology with five already granted. This technology received the Bronze Award in the Best Green ICT category (Innovation) at the Hong Kong ICT Awards 2012.

MPT further developed reflective-type pulse oximetry measurement modules for pulse oximetry, pulse rate and physical fitness measurement at finger. The measurement accuracy meets FDA requirements. Moreover, the modules received ISO13485 certification for design and development. One US patent application was filed for this technology.

The Tyre Pressure Monitoring System contains a low-cost SiP module, an antenna and receiver module
輪胎壓力監測系統技術，包括低成本的系統級構裝模組、天線和接收模組

構裝與感測技術

一套全新版本的胎壓監測系統技術已成功開發，包括系統級構裝模組（集成微控制器、射頻和微機電系統晶片）、天線和接收模組。該系統已被安裝於電動巴士作實地測試。群組就有關技術申請了十四項專利，其中五項專利已獲授證。該技術榮獲二零一二年香港資訊及通訊科技獎「最佳綠色科技獎」（創新）銅獎。

群組進一步開發可在手指上測量血含氧量、脈搏及體能狀態的反射式脈搏血氧測量模組。該測量模組的準確度已符合美國食物與藥物管理局的要求，其設計及開發亦已得到ISO 13485認證。群組就有關技術提交了一項美國專利申請。

Following the successful spin-off of anti-shaking compact camera module, MPT developed the world's smallest chip-size auto-focus camera module, which is only slightly larger than the image sensor chip. Different from traditional process, the module can be produced in 100 pieces simultaneously instead of one piece at a time, greatly reducing labour cost and complex manufacturing process. MPT filed five patent applications in the U.S. for this technology and one was granted.

Green Energy Technologies

MPT developed a 1,000-sun concentrator for concentrating photovoltaic (CPV) module. The concentrator's optical and module efficiency can reach as high as 85 per cent and 25.4 per cent respectively. Two patent applications were filed in the U.S. A 1kW CPV system showcase was installed in Hong Kong Science Park for performance evaluation.

The Group also developed high-power density anode material (240W-hr/kg) and the technology for fabricating novel anode material for lithium batteries. The R&D team won the Certificate of Excellent Paper at the International Conference on Chemistry and Chemical Engineering 2011 with this technology. One patent application was filed in the U.S.

繼成功開發微型防抖相機模組並進行業務分拆後，群組又成功研發出全球最小的晶圓級自動對焦相機模組，其面積比圖像感應器只略大一點。其製造方法亦別具創意，跟傳統的微型相機模組不同，晶圓級自動對焦相機模組能同時批量生產一百個相機模組，而不是一個一個地生產，因此能有效地降低勞動成本和複雜的製造過程。群組已就該技術申請了五項美國專利，其中一項已獲授證。

環保能源技術

群組開發出可用於一千倍聚光倍數聚光式光伏（CPV）模組的聚光器光學設計。該聚光器的光能轉換效率可高達百分之八十五，而CPV模組的光伏轉換效率可達百分之二十五點四。群組就該技術在美國申請了兩項專利。一個1kW CPV系統已安裝在香港科學園作表現評估。

由鋰離子電池研究組開發的先進電池電極材料，已通過了自動化生產線的工藝評估，功率密度規格可達240W-hr/kg。該技術榮獲二零一一年化學與化學工程國際會議優秀論文證書。群組已就該嶄新技術在美國申請了一項專利。

⬇ Parabolic Reflector
拋物面反射鏡
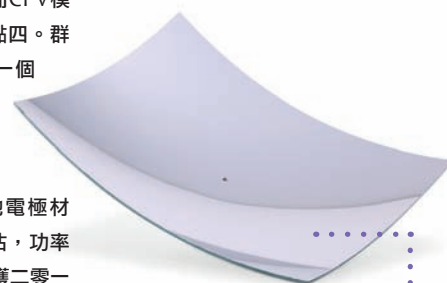
⬆ Advanced anode material and anode design for advanced lithium-ion batteries
適用於先進鋰離子電池的先進鋰離子電池陽極材料及電極技術

Want to know more?
想認識更多？

Integrated High Concentration Photovoltaic Module
高倍聚光光伏模組

High-efficiency Integrated Concentrating Photovoltaic Module for solar energy application.
供收集太陽能用的高效率聚光式光伏電池模組。

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

Commercialization
市場化

Wireless Motion Sensor ↑
無線移動傳感器

Intelligent Lighting Sensor Module
智能燈光感應模組

The highly flexible and intelligent Wireless Motion
Sensor can be used in corridors and staircases
to enhance energy saving capability.
高度靈活化和智能化的無線移動傳感器，可用於
走廊和樓梯，以提高節能效果。

LED Technologies

MPT collaborated with various government departments and
public organizations, including the Highways Department, Housing
Department and Hong Kong Science and Technology Parks
Corporation, on trial use of LED lighting including street lamps,
MR16 lamps and corridor lamps in public areas. Meanwhile, the five
U.S. patent-protected LED spot lamps are being sold in more than
400 shops worldwide by MPT licensees.

The Group's wireless lighting control technology was licensed to
four companies for developing digitally controlled LED-based indoor
lighting for better lighting quality and energy-saving.

LED技術

群組與香港政府部門及公共機構包括路政署、
房屋署及香港科技園公司等，合作展開LED燈
具試用計劃，包括在公眾地方試用LED路燈、
LED MR16 射燈和LED走廊燈等。現時擁有五
項美國專利保護的LED射燈，已透過專利授權
企業在全球超過四百家商店銷售。

群組開發的無線燈控技術已授權予四家公司，
用來發展以數碼控制的LED室內照明，可提高
照明質量及節省能源。

光學多點觸控技術已授權予香港、中國內地以
及印度的幾家公司，分別應用於公眾顯示屏及電
子白板。目前已完成試產，預計將於2012年進
入量產。

The optical multi-touch technology was licensed to several companies in Hong Kong, the Mainland and India to be used in public information display and interactive whiteboard. A pilot run was completed and mass production would proceed in 2012.

Three different versions of the pico-projector were commercialized in Hong Kong and the Mainland by three licensees. Among them, the newly developed and the world's first 3D dual-LCoS mini-projector would go into mass production in 2012.

Active dynamic LED backlight solution was licensed to nine Hong Kong and Mainland companies including several internationally known tier-one LED packaging companies, Mainland TV companies and public information display companies.

三種機型的微型投影機已授權給香港和內地三家廠商以進行商品化。當中最新研發的全球第一台3D雙LCoS微型投影機，也將會在2012年量產。

主動式動態LED背光控制方案已授權給九家香港和內地的公司，當中包括幾家國際知名的一線LED構裝廠、內地電視機品牌商和公共顯示系統公司。

Optical sensing modules of the multi-touch sensing system come in different dimensions to suit various display sizes
多點觸控系統的光學觸控模組有不同厚度，適合不同種類的顯示設備
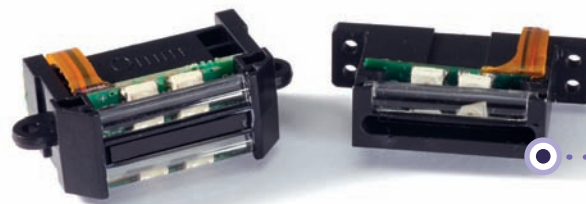
Want to know more?
想認識更多？

Optical Multi-touch Sensing Technology
光學多點觸控技術

Optical Multi-touch Sensing technology can easily transform an ordinary window display into an interactive multi-touch panel.
光學多點觸控技術能輕易地把一般的櫥窗改裝為多點互動觸控屏。

3D Wafer Level Package (WLP) Technology for CMOS Image Sensor (CIS) Fabrication
三維晶圓級CMOS圖像傳感器構裝技術

Polymer isolation solution reduces cost and improves yield for CIS fabrication, and can be applied to next-generation CIS fabrication.
應用聚合物絕緣的技術，可降低圖像傳感器製造的成本並提高其良率，可應用於下一代圖像傳感器的製造。

構裝與感測技術

市場化方面，包括四個傳感器及一個接收器模組的胎壓監測系統，已授權予一家內地生產商，雙方並簽訂了為期兩年的合約以準備進行量產。

不同設計的脈搏血氧測量模組已授權給三間在香港和內地的公司。群組與政府部門及公共機構合作，包括香港房屋協會，進行長者在家中使用脈搏血氧測量儀及健康指數採集器的試驗。

CIS Wafer with 3D-WLP Technology
應用三維晶圓級構裝技術的CMOS圖像傳感器晶圓

Packaging and Sensing Technologies

The SiP solution for Tyre Pressure Monitoring System including four sensors and one receiver won the support of a Mainland company for commercialization. A two-year contract was signed aiming at mass producing the SiP product.

Different versions of the pulse oximetry measurement modules were licensed to three companies in Hong Kong and the Mainland. MPT also collaborated with various government departments and

public organizations, including the Hong Kong Housing Society, on trial use of the pulse oximeter and aggregator for collecting health information of the elderly.

MPT continued to support its industrial partner through exclusive licensing of the anti-shaking technology. The technology is well recognized in industry and the partner is actively preparing mass production. Also, new contracts were signed with several companies aiming at transferring the compact camera platform technologies to industry.

The 3D packaging solutions were transferred to several tier-one companies including 3D-SiP solution for next generation communication modules for the Mainland's high-speed train applications, TSV software for via filling process design and optimization for 3D-IC applications, and polymer isolation-based 3D-WLP solution for TSV type CIS applications.

在防抖相機技術方面，群組繼續支援獲獨家授權的工業夥伴。該防抖技術已得到業界廣泛認同，相關的工業夥伴已積極部署量產。另一方面，群組與幾家公司簽訂了合約，藉此把相機模組的相關技術轉移到業界。

群組的三維構裝方案已成功轉移至多家一級企業，包括可應用在中國高速鐵路的下一代通訊模組的三維系統構裝方案、應用於三維晶片上的矽通孔填充工藝的設計與優化模擬軟體及應用於矽通孔型CMOS圖像感測器，以及基於聚合物隔離技術的三維晶圓級構裝方案。

The Reflective Pulse Oximetry Measurement Module can work with smartphones or tablets through different wireless technologies such as Bluetooth
反射式脈搏血氧測量模組可通過不同的無線技術如藍牙，與智能電話或平板電腦連接使用

Want to know more?
想認識更多？

Reflective Pulse Oximetry Measurement Module
反射式脈搏血氧測量模組

The Reflective Pulse Oximetry Measurement Module can easily integrate with consumer electronics or health equipment for fitness assessment after exercising.
反射式脈搏血氧測量模組能與消費電子產品或健康器材整合，方便運動後評估身體狀況。

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

Future Development
未來發展

With ASTRI's advanced
anode technology, high
capacity lithium-ion
batteries can increase up
to 50 per cent the usage
time of electronic devices
應科院的高容量鋰離子電池陽極
技術可延長電子設備百分之五十
的使用時間

In the coming year, MPT will develop and deliver innovative solutions targeting the following applications:

在未來一年，材料與構裝技術群組的目標是建立和提供下列創新應用技術方案：

|	
Internet of Things application for 3D-SiP technology: anti-counterfeit identification microsystem	三維系統級構裝技術在物聯網的應用：防偽認證微系統
Internet of Things for anti-counterfeit microsystem by SiP technology	系統級構裝技術在物聯網的應用：防偽認證微系統
Intelligent omnidirectional LED bulb	智能全方位LED燈泡
Interactive displays for e-classroom	電子教室互動顯示
High-capacity anode in embedded LIB for popular consumer electronics	適用於消費電子產品鋰離子電池的高容量陽電極
LED phosphor layer jet printing	LED磷光噴印
Mechanism-based software for 3D-interconnect fabrication	應用於三維互連製造的機理性軟件
Cardio-vascular monitoring devices for tele-care system	用於遠程照顧的心血管監察儀
SiP-based hybrid mode real-time locationing system	基於系統級構裝的混合式實時定位系統

Project Highlights
研發項目

	Project 項目	Duration 時期
LED Technologies LED技術		
1 ⓟ	Intelligent Lighting Sensor Module 智能燈光感應模組	Nov 2011 – Jan 2013 二零一一年十一月至二零一三年一月
2 ⓟ	Panel Level LED Packaging Platform Development 面板級LED構裝技術平台開發	Dec 2011 – Jun 2013 二零一一年十二月至二零一三年六月
3 ⓟ	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 ⓟ	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
Packaging and Sensing Technologies 構裝與感測技術		
5 ⓢ	Mechanism-based Simulation Software for Intelligent 3D-IC Via Filling 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
6 ⓟ	3D Wafer-level Packaging (3D-WLP) Technologies for Low-cost CMOS Image Sensor 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
7 ⓟ	Compact Optical Zoom Module 微型光學變焦相機模組	Dec 2011 – Sept 2013 二零一一年十二月至二零一三年九月
8 ⓟ	Modularized Ubiquitous Healthcare Electronics 模組化及無處不在的醫療保健電子	Nov 2010 – May 2012 二零一零年十一月至二零一二年五月
9 ⓟ	MEMS Ink Jet Head for Wide-format Printing 用於寬幅印表機的噴墨印表頭	Aug 2010 – Jul 2012 二零一零年八月至二零一二年七月
Green Energy Technologies 環保能源技術		
10 ⓟ	Integrated Concentrating Photovoltaic Module 聚光式光伏（CPV）電池模組	Nov 2010 – Nov 2012 二零一零年十一月至二零一二年十一月

ⓟ Platform Project
平台項目

ⓢ Seed Project
種子項目

Bio-Medical Electronics Team
生物醫學電子組
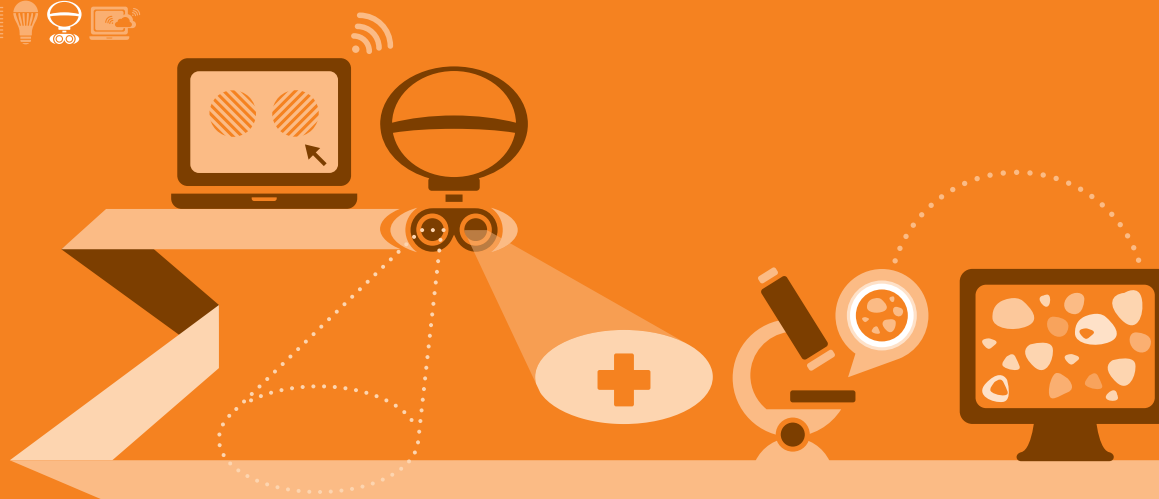
In the past year, the Bio-Medicial Electronics (BME) Team continued focusing on human factors, evaluations in clinical environment and support for medical regulatory. The Team established a more stable operational structure and expanded its connections with local hospitals and medical schools.

After completing the seed project in high-speed digital pathology, BME signed a technology licence agreement with a major Hong Kong optic-medical equipment manufacturer. With its support, the Team commenced a platform project for developing key technology modules of the digital pathology system.

過去一年，生物醫學電子組之研發工作繼續以人為本，著重臨床環境評估和支持醫療監管。小組已建立較為穩定的業務結構，並擴大與本地醫院和醫學院的聯系。

在完成高速數碼化病理切片種子項目後，小組與香港一個主要的光電醫療設備製造商簽署了技術授權合約，在他們的支持下，小組開展了一個平台項目，研發數碼化病理切片系統之關鍵技術模塊。

Visual Electrophysiological System
視覺電生理診療儀
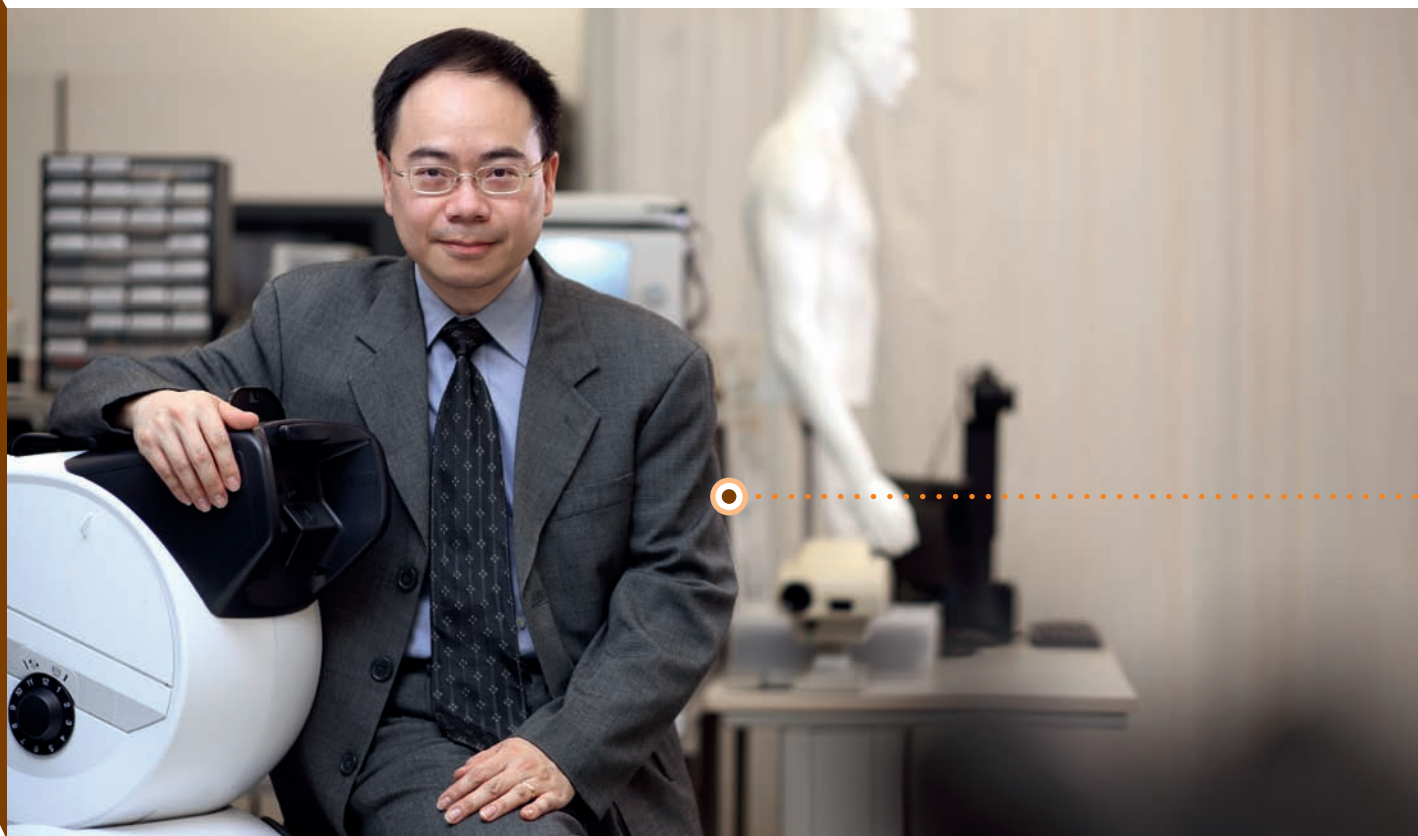
What is your work objective?
你的工作目標是什麼？

I have a vision of making contribution to medical and
healthcare development in Hong Kong.
我的願景是能夠為本港的醫療保健發展作出貢獻。

Mr. Felix Chan 陳國萬先生
Senior Manager 高級經理

**ASTRI's R&D
talent are working
closely with our experts
in different areas.
應科院有很多卓越的科
研人才，與我們的專家
配合，從多方面研發。**

Mr. Stephen Chan 陳沛欣先生
Managing Director,
Speed Fair Company Limited
香港協勵行有限公司 董事總經理

Portable Medical Goggle System
便攜式醫療電子目鏡

Portable Medical Goggle System for brain-vision training of children.
專為兒童腦視覺訓練而設的便攜式醫療電子目鏡。

小組已完成了治療弱視和雙眼立體視覺訓練設備平台項目。該設備分別在北京一所重點醫院、本地一所大學的眼科視光學診所，及本地一間私人視光診所內測試，結果令人滿意。小組就視覺訓練和設備獲得一項美國專利。

小組在咨詢外科醫生的意見後，又開始了另一個研發微創手術護目鏡的種子項目，該護目鏡毋需用手操作而可按醫生指示切換病人體內外影像，適用於微創手術。

Functional Vision Analyzer
綜合視覺功能檢測分析儀

=1 number 數目   =1 million(HK$) 百萬(港元)

Patent Granted 獲批專利數目	1	
Contract Signed 與業界簽訂合約數目	1	
Income Received from Industry* 業界收入*	0.8	

*Including cash and in-kind contribution 包括現金及物資資助
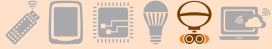
Patent Granted 獲批專利

Technological Area	涉及科技範疇
Vision Treatment and Device	視覺訓練和設備

BME also completed a platform project on a brain training device for treating amblyopia and binocular vision training. The device was tested in a major Beijing hospital, an optometry clinic of a local university, as well as a private Hong Kong eye-clinic, with promising results. BME was granted a U.S. patent on Vision Treatment and Device.

After consulting surgical doctors, the Team also started another seed project to develop an on-demand, see-through and touch-less video goggle for minimally invasive surgery.

Portable Medical Goggle System
便攜式醫療電子目鏡

Bio-Medical Electronics Team
生物醫學電子組

Innovations
技術突破

Diagnostic MR Elastography Device (Palpategram)

BME developed a Piezoelectric vibration actuator array and the corresponding controller. The Team is working with the reputable Mount Sinai Medical Centre in New York, to set up pre-clinical trial protocol for phantom and animal subjects.

Multi-function Brain Training Device (BTD) for Amblyopia Treatment and Binocular Vision Training

BME developed and fabricated a portable, stand-alone, brain-vision training head-mounted device with patient specific backlight control prototypes. The Team also completed a user-friendly amblyopia treatment software with enhanced training algorithm and analysis. A total of 50 patients were evaluated in a major hospital in Beijing, while user studies were also conducted at two locations in Hong Kong. These studies showed improvement in patients over 10 years of age. The technology is being adapted in popular consumer electronics devices for brain training.

High-speed Digital Pathology (HSDP) System

In a seed project, BME developed two sets of lens with both large field of view and high resolution for whole slide imaging. It also completed a high-speed slide scanner prototype with real-time image stitching and viewing functions. BME conducted the first small scale trial of digital pathology diagnosis in a public hospital in Hong Kong and received positive feedback. A platform project has been approved and the prototype system of the imaging and focusing modules are being developed.

Minimally Invasive Surgery Goggle

In another seed project, BME completed optical design and simulations for two types of high resolution micro-displays. The Team, besides developing a mechanical mock-up design and fabrication, is also focusing on a light weight, ergonomic video head-mounted display system for surgeons to wear comfortably for an extended period of time.

彈性成像診斷儀（觸診儀）

生物醫學電子組研發出壓電振動驅動器陣列和相應的控制器。小組正與著名的美國紐約西奈山醫療中心合作設置預臨床試驗，於人體模型和動物身上進行測試。

弱視治療和雙眼立體視覺訓練之多功能腦訓練儀

生物醫學電子組已成功研發出一種可攜帶、獨立的腦視覺訓練頭戴設備，可按個別病人需要控制背光。小組並完成了增強培訓的算法和分析及方便治療弱視的軟件。小組在北京一重點醫院替50名患者進行了測試，又在香港兩個診所為患者進行測試。測試結果顯示該訓練儀對10歲以上患者有效，可幫助改善視力。小組現正努力將該技術應用於一般消費電子設備作腦訓練用途。

高速病理切片數碼化系統

生物醫學電子組完成了一個種子項目，設計了兩組大視場高解析度的鏡頭，並為整個病理切片成像的設計，製成了一個具備高速與實時圖像拼接和瀏覽功能的軟件原型。小組在香港一所公立醫院進行了第一次小規模的數碼化病理診斷的試驗，獲得良好反應。平台項目現已獲批，小組現正研發成像和對焦模塊的原型。

微創手術護目鏡

在另一個種子項目中，生物醫學電子組完成了兩類高解析度微顯示光學設計和模擬。除了進行機械模擬設計和原件製造，小組正在研發一種輕便、符合人體工程學的頭戴式顯示器，以便外科醫生可長時間佩戴仍感覺舒適。

Commercialization
市場化

BME signed a licence agreement with a major Hong Kong optic-medical equipment company with manufacturing facilities on the Mainland, which facilitated easy transfer of technologies for developing a high-speed digital pathology system in a platform project. The Team also signed a contract research agreement with that company to design and fabricate a reference system for two-key modules to be adapted to the licensee's high-speed digital pathology system.

BME is playing an active role in enhancing cooperation between Government, industry, academia and research institutes. In most projects, in addition to industrial partners, the Team work with government hospitals, medical and nursing schools of local universities, and the school of optometry of a local university.

In the high-speed digital pathology system platform project, BME sought input from and conducted trials in the pathology departments of various local hospitals. During the seed project stage, BME conducted the first small scale trial of digital pathology diagnosis in Hong Kong. Large scale diagnosis trial and image management development will be conducted during the platform project.

With the support of the Innovation and Technology Commission, BME participated in the Hong Kong Housing Society's iHome project. In a demo apartment equipped with automatic household devices tailored for the elderly, ASTRI's e-healthcare technologies including the tele-health hub system jointly developed by ECE and BME were installed for free trials. The iHome, since officially opened in March 2012, has received good feedback from numerous visitors.

⬆ Portable Medical Goggle System for Adults
成人便攜式醫療電子目鏡

生物醫學電子組與香港一間主要光電醫療設備公司簽署了技術授權合約，該公司的生產設施位於中國內地。該合約將高速數碼病理系統技術轉移至平台項目內繼續開發。雙方還簽署了合約研究項目，設計和製造適合該公司的高速數碼病理系統的關鍵模塊的參考系統。
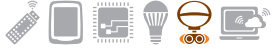
生物醫學電子組致力加強與政府、工業界、學術界和研究機構之間的合作。在大多數研究項目中，除了業界合作夥伴，小組又與政府醫院，各大學醫學院、護士學校，及一所大學的視光學院合作。

在研發高速數碼病理系統平台過程中，生物醫學電子組一直積極尋求病理學專家的意見，以及在本地幾間醫院的病理科進行系統測試。在種子項目期間，小組在香港進行了第一次小規模的數碼病理診斷試驗。在平台項目中，小組將進行大規模的數碼病理診斷測試和圖像管理研發。

在創新科技署的支持下，生物醫學電子組有份參與香港房屋協會的「智型居」計劃。在一個專為長者而設計，安裝了家居自動裝置的示範單位內，設置了由應科院研發的幾樣電子醫療設備，當中包括由企業與消費電子群組及生物醫學電子組合作研發的遠程健康照顧系統，給訪客試用。「智型居」在二零一二年三月正式啟用以來，已吸引大量訪客參觀，反應良好。

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

Virtual Microscope for Pathology Diagnosis
可替代顯微鏡的數碼化病理切片系統

BME will continue developing applied technologies with strategic directions driven by market demands. Current key technology focuses are head-mounted display, digital pathology, tele-health and screening and early diagnosis. All these projects address current medical and healthcare issues such as aging population, escalating healthcare costs and inadequate supply of medical staff.

Head-mounted Display

With state-of-the-art high resolution micro-display, BME will embark on a platform project to develop an on-demand, see-through and touch-less control video goggle for minimally invasive surgery. The goggle will incorporate advanced features such as 2D/3D switching and real-time video wireless streaming. The Team will also develop an immersive video goggle specifically designed for distraction from pain in medical procedures. The technology is expected to be applied to immersive therapies in various medical fields.

生物醫學電子組將繼續採取基於市場需求來決定發展應用科技項目的策略。現時主力開發的技術包括：頭戴式顯示器、數碼化病理學、遠程醫療和篩選及早期診斷。這些項目都是針對目前社會所面對的問題，例如人口老化、醫療費用不斷攀升，醫務人員供應不足等，為市民開發更好的醫療設備。

頭戴式顯示器

生物醫學電子組開展了一個平台項目，以先進的高解析度微顯示器技術，研發一個可按需要、無需用手控制切換之微創手術護目鏡。該護目鏡配備二維／三維的切換和實時視頻無線串流等先進功能。此外，小組也會研發一個沉浸式觀感視頻護目鏡，目的是讓病人在接受醫療程序時，分散他們的注意力，以減輕痛楚，預期此沉浸式觀感視頻技術可擴展至其他醫學領域使用。

Digital Pathology

This platform project of high-speed digital pathology system will focus on developing technologies to speed up the pathological glass slide digitization process, as well as providing high quality digital images acceptable by pathologists. As the images are recorded in digital formats, it is possible to use various image processing algorithms such as image segmentation, pattern recognition and statistical analysis to aid pathologists in determining medical assessments. BME will work with pathologists to develop effective pathological application software.

Tele-health

BME will explore various available or new devices and peripheral applications focusing on users and patients, and will extend the applications to other areas such as remote stroke rehabilitation. After trial application on chronic obstructive pulmonary disease patients, BME will continue developing applications in other diseases such as diabetes and hypertension. Moreover, BME will continue working with ECE to develop the tele-health hub system with emphasis on implementation in clinical environments.

Screening and Early Diagnosis

BME will conduct exploratory research to develop simple devices for screening and early diagnosis of health abnormalities, including a simple visual and electro-physiological device to screen vision function of non-verbal subjects such as infants and young children.

數碼化病理學

高速數碼化病理系統平台項目，主要是開發新技術，以加快病理切片數碼化過程，並提供可以滿足病理學家要求的高質量數碼圖像。當病理切片變成數碼化圖像後，便可以利用各種圖像處理算法，如圖像分割、模式識別及統計分析，來協助病理學家進行醫療評估和診斷。生物醫學電子組將與病理專家合作開發這些應用軟件。

遠程醫療

生物醫學電子組將探討各種針對用家和病人而設的新設備、現有設備和外設應用，並將遠程醫療擴大到其他領域，如遠程中風康復中的應用。繼去年在慢性阻塞性肺病患者中進行遠程醫療測試，小組將繼續為其他種類疾病開發應用，例如糖尿病和高血壓。此外，生物醫學電子組將繼續與企業與消費電子群組合作，研究在臨床環境中使用遠程保健中心的平板電腦。

篩選及早期診斷

生物醫學電子組將進行探索性研究，研發可用於篩查和早期診斷發育或健康異常的簡單設備，包括為沒有語言力能力的對象，如嬰兒及幼兒，設計一個簡單的視覺電生理設備來篩選視覺功能。

		Project 項目	Duration 時期
1	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
2	P	Multi-function Brain Training Device for Amblyopia Treatment and Binocular Vision Training 弱視治療和雙眼立體視覺訓練之多功能腦訓練儀	Jul 2010 – Dec 2011 二零一零年七月至二零一一年十二月
3	P	Magnetic Resonance Imaging Incubator 磁共振成像培養箱	Jul 2010 – Sep 2011 二零一零年七月至二零一一年九月
4	P	High-speed Digital Pathology System 高速病理切片數碼化系統	Feb 2012 – Aug 2013 二零一二年二月至二零一三年八月
5	S	Feasibility Study of High-speed Digital Pathology System 高速病理切片數碼化系統可行性研究	Jan – Jul 2011 二零一一年一月至七月
6	S	Innovation and Technology for Enhancing Quality Life for 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
7	S	Minimally Invasive Surgery Goggle 微創手術護目鏡	Jan – Jun 2012 二零一二年一月至六月

P Platform Project
平台項目

S Seed Project
種子項目

Exploratory Research Laboratory
信息研究室
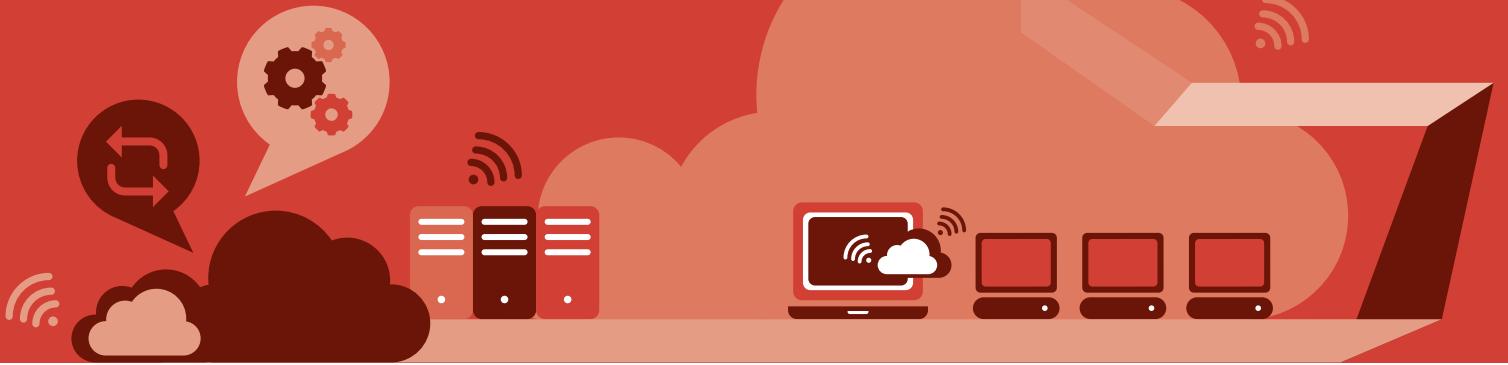
The Exploratory Research Laboratory (ERL) was established in late 2011 with the mission to explore and research into emerging and interdisciplinary technologies which have business potentials and social benefits. In the wake of the recent emergence of cloud computing and mobile devices, as well as the rising popularity of Internet services and applications, ERL chose to start by focusing on software and Internet technologies which have significant impact on society. ERL finished two seed projects on cloud computing and data mining technologies during the short period after its establishment. Following these, it is expected that two platform projects will be launched in the coming year.

信息研究室於二零一一年年底成立，以探索和研究具有商業價值及社會效益的跨領域新興科技為目標。基於近年雲端技術、移動裝置、互聯網服務平台等技術的迅速發展和日趨普及，信息研究室於起步階段便專注於研發軟件及互聯網技術。自成立以來短短數月時間內，信息研究室已經成功完成了研究雲端計算及數據挖掘兩個種子項目，並正預備利用這些種子項目的成果及經驗開展兩個平台項目。

A Data Analytics System can extract hidden patterns from a huge quantity of data, leading to better data-driven decision making
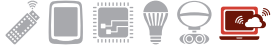數據分析系統可從大量數據中找出有用資料，用來作為數據導向決策的參考
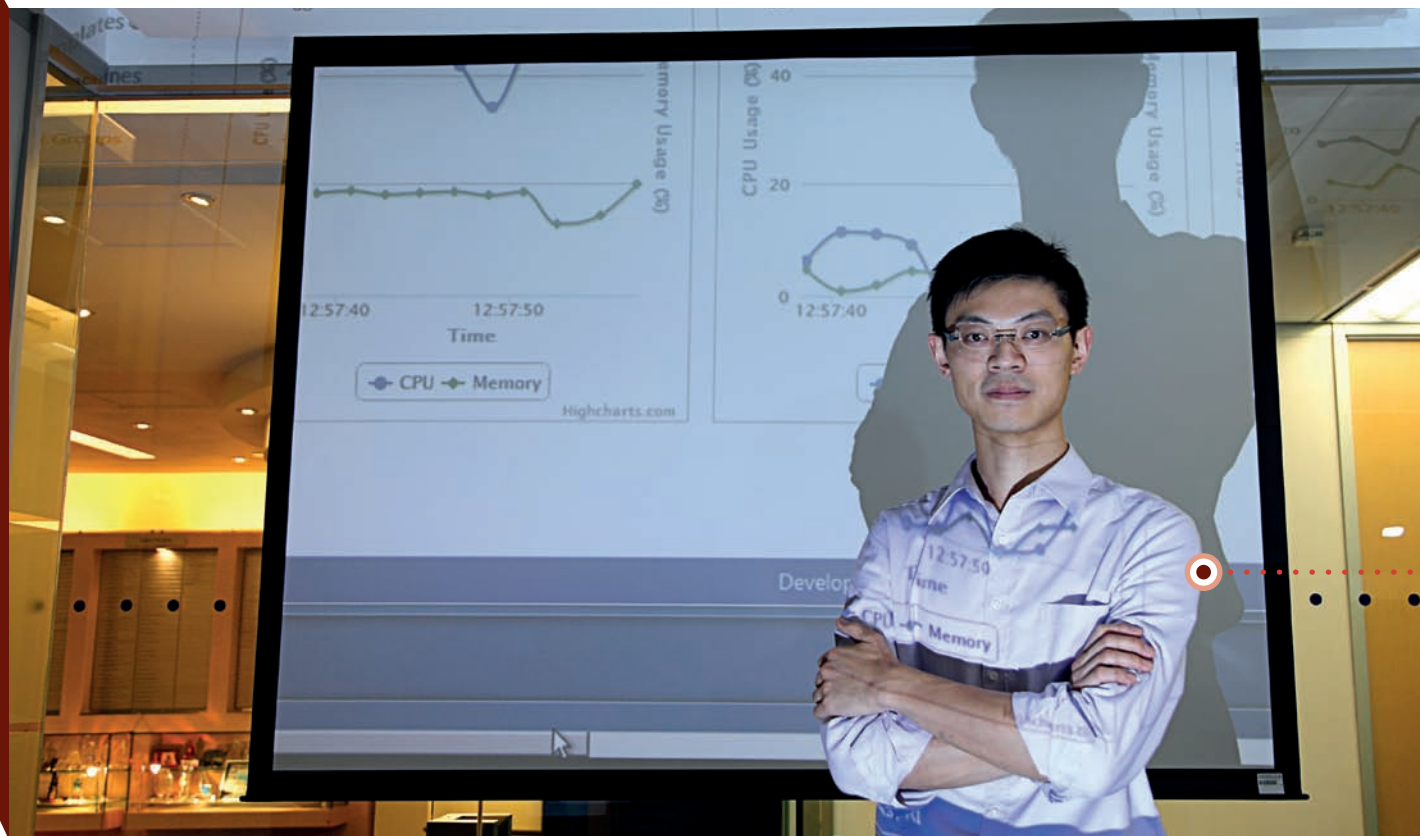
What is your source of inspiration?
你的創作靈感從何而來?

The Internet is my source of inspiration and best
working partner because it connects me with people
and the world.
互聯網是我的靈感來源,也是我的最佳拍檔,因為它讓我
可以與人交流,與世界接軌。

Dr. Albert Au Yeung 歐陽靖民博士
Senior Engineer 高級工程師

Exploratory Research Laboratory
信息研究室

Innovations
技術突破

A Cloud Management System
can improve the utilization
efficiency of computing
resources by pooling physical
servers and aggregating
user demands
雲端管理系統能夠結合主機群組的
資源，及匯聚不同用戶的需求，
使計算資源的使用效能提升

Cloud Management Technologies

In recent years, cloud computing has emerged as a way of delivering computing resources via the Internet. It makes use of virtualization technologies to achieve cost-effectiveness and scalability. Computing resources can be offered to users in near real-time, depending on user demands.

One important component in cloud computing infrastructure is the cloud management system, which is responsible for managing all computing resources in a data centre, such as physical machines (servers) and storage devices. It is responsible for optimizing these resources when creating virtual machines to support various user requirements.

雲端管理技術

雲端計算近年在全世界蓬勃發展，很多雲端應用及服務應運而生。雲端計算利用虛擬化技術來擴展計算資源、降低計算成本，並基於用戶需求，為其提供實時的計算資源。

雲端管理系統是雲端基礎結構的一個重要組成部份。它負責管理整個數據中心內的所有計算資源，如伺服器及存取裝置，監察各種資源的使用率，優化資源分配，並向不同的使用者分發計算資源及計算他們的使用量。

在剛完成的種子項目中，信息研究室成功開發了一個以開源技術為基礎的雲端管理系統的原型。利用此技術，數據中心或企業可以輕易地把現有的伺服器群轉換成雲端基礎建設，以向用戶提供不同類型的雲端服務。在接下來的平台項目中，信息研究室會繼續開發此雲端管理技術，加入更先進的數據保安技術，及建設虛擬伺服器群的功能，以應付計算密集型和數據密集型的雲端應用。信息研究室期望此技術可以支援本地的數據中心和互聯網服務提供商，使其以較低的成本為本地各行業及大眾提供低廉而可靠的雲端服務。

In one seed project, ERL developed a prototype cloud management system with reference to existing open source technologies. Using this system, a data centre or company can easily transform its server cluster into a cloud computing infrastructure for providing different cloud services to users. In the coming platform project, the management system will be further developed to offer higher security and capability to handle complex computational tasks with virtual clusters. These technologies are expected to benefit local data centres and Internet service providers, which will provide affordable and reliable cloud computing services to enterprises and the general public.

Service Quality Data Analytics and Data Mining Technologies

Data mining refers to the process of finding hidden patterns in a large volume of data. One data mining application is to extract hidden patterns from service quality related data to gain insight on how service quality can be improved, which is particularly useful for the service industry and the public sector. In one seed project, ERL developed a technology for service quality data analytics, with specific considerations given to applications in the public sector.

Besides various statistical tools and data mining algorithms for extracting hidden patterns from service quality data, the system also features advanced data mining and processing algorithms and an interactive interface, which allow a huge quantity of data to be queried real-time, enabling users to identify useful patterns quickly and make optimal decisions.

ERL collaborated with the Complaints Against Police Office (CAPO) of the Hong Kong Police Force in this project. The service quality data analytics system was successfully deployed to analyse the huge amount of data related to complaints against police officers filed by the public in the past two decades. The hidden patterns identified as a result have become important reference for CAPO, helping them to identify ways of reducing complaints and improve the force's service quality. The system is equally useful for analysing data related to service quality in other organizations.

服務品質數據分析及挖掘技術

數據挖掘是指透過分析大量數據來找出有用資訊的技術。其中一種是透過分析有關服務品質的數據,來找出能夠提升服務品質的方法,這種應用對服務性行業及公營機構特別有用。在剛完成的種子項目中,信息研究室研發了一套針對公營機構需要而設計的服務品質數據分析系統。

此系統不僅提供了多種統計工具及數據挖掘算法,更採用了很多先進的數據處理技術及互動性介面,讓使用者可以實時進行各種不同的數據挖掘程序。用戶可以在很短的時間內得到分析結果,以支援有關服務品質的決策過程。

信息研究室與香港警務處的投訴及內部調查科合作,利用該系統分析過去二十年公眾投訴警務人員的資料,結果發現了多個容易導致公眾投訴的情況,此次分析結果為改善警務處的服務質素提供了很有參考價值的資訊。此項數據挖掘技術可被廣泛應用於分析不同企業有關服務品質的數據。

Data Analytics has a wide range of applications, such as service quality enhancement, targeted marketing, recommendation system, fraud analysis and sentiment analysis
數據分析有很多不同的應用,例如:優化服務質素、目標市場營銷、推薦系統、欺詐分析及情緒分析等

Exploratory Research Laboratory
信息研究室

Future Development and Project Highlights
未來發展及研發項目

ERL will continue to focus on both cloud computing and data mining.

Cloud computing is becoming increasingly important as more services and applications are deployed on the cloud. ERL envisages a great demand in technologies supporting various applications running on the cloud. Hence, ERL will also focus on platform technologies facilitating the development of cloud-based applications.

ERL also believes data mining, particularly Big Data, will be a big challenge for the IT industry. Big Data refers to datasets too large and complex for conventional database software to handle. The challenge is the ability to efficiently process Big Data and extract insights for enterprises or organizations to make better decisions. It is expected that there will be great demand for technologies that support Big Data analytics. Hence, ERL plans to develop technologies for managing, processing, analysing and visualizing huge datasets to meet the needs of market.

信息研究室會繼續專注研發雲端計算及數據挖掘的相關技術。

由於各種雲端應用和服務的普及，雲端計算技術的重要性正在不斷提高，市場對雲端科技應用技術的需求亦將會不斷增加。因此，在完成雲端管理技術的開發後，信息研究室將專注於研究支援雲端應用程序開發的平台技術，以幫助本地的軟件企業開發更高質素的雲端應用或服務。

另一方面，信息研究室相信數據挖掘，特別是「大數據」會是資訊科技業即將要面對的挑戰。大數據泛指一些數量龐大、結構複雜以致於不能單靠傳統數據庫或分析工具來處理的數據。在此情況下的挑戰在於如何有效率地處理大數據及利用創新的數據挖掘技術來找出對企業或機構有價值的資訊，可以預期各種支援分析及挖掘大數據的技術會有很大需求。信息研究室會集中研究及開發有關管理、處理、分析及可視化大量數據的技術，以滿足各行各業對數據挖掘的需求。

Ⓢ Seed Project
種子項目

	Project 項目	Duration 時期
1 Ⓢ	Service Quality Analytics Technology – Managing and Analyzing Complaints in the Public Sector 服務品質評估技術—管理和分析公眾投訴	Aug 2011 – Jan 2012 二零一一年八月至二零一二年一月
2 Ⓢ	Shenzhen-Hong Kong HPC Peer Cloud Feasibility Study 深港科技雲可行性研究	Aug 2011 – Apr 2012 二零一一年八月至二零一二年四月

06/05
2011

ASTRI organized an Open Day to let R&D enthusiasts discover the excitement of an R&D career. The event, which included experience sharing, career talks and an exhibition, attracted more than 200 students and members of the public.
應科院舉行開放日，介紹應用研究工作的箇中樂趣，活動包括經驗分享、職業講座及展覽，吸引超過二百位有志投身科研行列的學生及各界人士參加。

16/04
2011

ASTRI launched an "e-Reading Trial Programme" with the aim of enhancing e-learning in Hong Kong. Participating schools were provided with ASTRI-developed e-readers loaded with e-books to help instil a reading habit in students. Nearly 70 schools joined the programme.
應科院推行「電子閱讀試驗計劃」，目的是推廣本地電子學習風氣。參加計劃的學校獲發由本院開發並載有多本電子圖書的電子閱讀器，以培養學生的閱讀習慣，近七十間學校參加了該計劃。

2011

04　05　06

01-03/06
2011

Organized by the Institute of Electrical and Electronics Engineers (IEEE) and co-organized by ASTRI and the Hong Kong University of Science and Technology, the first IEEE Technology Time Machine Symposium was held in Hong Kong. Financial Secretary Mr. John Tsang and IEEE President-Elect Dr. Gordon Day officiated at the ceremony (third and fourth from the left). About 200 technologists from all over the world attended the three-day event.
由國際電機電子工程師學會（IEEE）主辦，應科院及香港科技大學合辦的首屆「IEEE科技領袖研討會」於香港揭幕，並由財政司司長曾俊華先生及IEEE會長Gordon Day博士主禮（左三及四）。來自世界各地近200位科技界專家參加了這個為期三天的業界盛事。

07/07
2011

A seven-member delegation from Hong Kong Legislative Council, including Mr. Wong Ting-kwong (fourth from left), Mr. Vincent Fang (fourth from right), Ms. Emily Lau (sixth from right), Mr. James To (fifth from right), Mr. Ip Wai-ming (third from left), Dr. Pan Pey-chyou (sixth from left) and Ms. Audrey Eu (third from right), visited ASTRI to learn about its latest development.

立法會議員一行七人,包括黃定光議員(左四)、方剛議員(右四),劉慧卿議員(右六)、涂謹申議員(右五)、葉偉明議員(左三)、潘佩璆議員(左六)和余若薇議員(右三)蒞臨應科院參觀,以了解本院的最新發展。

2011

06

07

18-22/06
2011

ASTRI showcased its latest technologies at the Hong Kong Pavilion set up by the Fujian Province Economic and Trade Commission in the Ninth China Cross-Straits Technology and Projects Fair, which captured the attention of thousands of visitors.

應科院參展於福州舉行的「第九屆中國海峽項目成果交易會」,在福建省經濟貿易委員會設置的「香港館」展示應科院的最新科技,吸引數以千計人士到場參觀。

09-25/07
2011

To show support for young scientists and encourage them to put innovative ideas into practical use, ASTRI sponsored the Joint School Science Exhibition for the third consecutive year.

為了支持青年科學家追尋科學夢,鼓勵將創新意念融入生活,應科院連續三年以金贊助形式支持聯校科學展覽。

06-08
2011

A group of 28 students from local and overseas universities joined ASTRI as summer interns. They were placed in actual working environments as researchers, taking part in different research projects of ASTRI.
來自本地及海外大學共二十八位學生參加了應科院舉辦的暑期實習研究員計劃，期間獲安排參予本院不同的研發項目，一嘗科研工作的樂趣。

12-23/08
2011

More than 1,000 portable projectors jointly developed by ASTRI and Shenzhen ACTO Digital Video Technology Co. Ltd. were provided to reporters at the World University Games 2011. The pico-projector, with wireless connection to the event's official website, allowed the press to pick up any game to view anytime, anywhere.

逾千部由深圳雅圖數位視頻技術有限公司與應科院合作研發的便攜式智能微型投影機，於世界大學生運動會期間，免費提供予中外記者使用。利用該微型投影機配合無綫傳輸技術，連接大運會官方網站，記者可隨時隨地收看精彩賽事實況，作詳盡報導。

08

09

07 & 28/09
2011

The 2011 ASTRI Industry and University Consultation Forum was held twice in Shenzhen and Hong Kong respectively, attracting more than 700 participants from industry and academia. A total of 120 R&D projects were introduced to cultivate collaboration opportunities.
逾七百位業界及學術界人士參加了「2011應科院科技項目推介會」。是年推介會分別於深圳及香港舉行，共介紹了一百二十個技術項目，發掘合作商機。

2011 ASTRI Industry and University Consultation Forum (Hong Kong)

13/10
2011

Nearly 80 ASTRI staff members took part in ORBIS's World Sight Day to show concern for the visually impaired by wearing a specially designed ORBIS pin and making donations to help ORBIS fight blindness.

接近80位應科院員工積極響應奧比斯「世界視覺日」，於活動當日一起戴上奧比斯襟章，並捐款支持奧比斯的救盲工作，以行動表達對視障人士的支持。

16-21/11
2011

ASTRI showcased its state-of-the-art prototypes and technologies at the 13th China Hi-Tech Fair held in Shenzhen under the theme "Promoting international cooperation on innovation and accelerating transformation of development mode".

應科院參展於深圳舉行的第十三屆「中國國際高新技術成果交易會」，並配合是次會議「促進國際創新合作，加快發展方式轉變」的主題，展示了最新科研項目及展品。

10

11

05-13/11
2011

Revolving around the theme "New Dimensions of e-Living", ASTRI's showcase of new technologies for e-health, e-learning and e-infotainment at InnoCarnival 2011 attracted thousands of visitors. A Digital Travel Competition held during the show provided pupils from 13 primary schools with the opportunity of experiencing the fun of mobile learning using ASTRI's e-readers.

應科院以「新角度‧新體驗」為主題，於「創新科技嘉年華2011」展出環繞電子保健、電子學習及電子資訊娛樂三方面的新科技，吸引成千上萬市民到場參觀。展會期間並舉行了「數碼遊蹤邀請賽」，讓來自本地十三間學校的小學生利用本院研發的電子閱讀器進行比賽，體驗移動學習的樂趣。

11-13/01
2012

The IEEE Board of Directors held its meeting in Hong Kong for the first time. Arranged by ASTRI, they visited corporations in Hong Kong and Shenzhen for better understanding of technology developments in both cities. The delegation was received by Dr. Xu Qin (standing), Mayor of Shenzhen Municipality, during their visit to Shenzhen.
國際電機電子工程師學會（IEEE）首次在香港召開董事會議，在應科院安排下，IEEE會董參觀港深企業，了解兩地在高新科技領域的發展。一眾董事於訪問深圳期間獲深圳市許勤市長（中間站立者）接待。

10/03
2012

ASTRI supported the Hong Kong Housing Society's iHome project to promote a comfortable and modern lifestyle for senior citizens by using new technologies. ASTRI installed its e-health devices in the model flat in Yau Ma Tei for free trials by visitors.
應科院支持香港房屋協會建立「智型居」，向長者推廣利用新科技開創舒適和現代化的生活模式。本院的電子醫療設備已安裝位於油麻地的模擬家居，供訪客試用。

12

2012

01   **02**   **03**

07/02-01/03
2012

ASTRI and Picochip (acquired by Mindspeed) jointly completed the design and validation of the industry's first commercial-grade LTE FDD femtocell physical layer software. The production ready TD-LTE small cell reference design was also demonstrated for the first time at the Mobile World Congress 2012 held in Barcelona, Spain.
應科院和英國Picochip公司（已獲敏迅科技收購）攜手完成業界首款商用級LTE-FDD家庭基站物理層軟件的設計和驗證。該TD-LTE小蜂窩基站的可生產參考設計其後在西班牙巴賽隆納舉行的2012年全球移動通訊大會中首次展出。

Financial Report
財務報告

Overview
概況

During FY2011/12, ASTRI continued to be prudent in its financial management. The net income before tax and plough back to the Government amounted to HK$10,202,402. During the year, ASTRI ploughed back HK$10,759,812 to the Government.

The income recognized for the year amounted to HK$440,792,341, of which funds from the Government comprising HK$130,290,388 recurrent subvention, HK$266,721,501 ITF project funds, HK$414,870 ITF General Support Programme and HK$3,845,761 ITF Internship Fund. The income from the industry directly attributable to R&D projects amounted to HK$28,932,204, which was roughly at the same level as the previous year. Meanwhile, the other income not directly attributable to R&D projects increased from HK$23,318,158 in FY 2010/11 to HK$33,439,344 in FY 2011/12. The increase was mainly due to the increase in contract research activities, which the customers funded 100% of the research cost.

The total expenditure of RS amounted to HK$133,048,578, which represented an increase of HK$9,971,449 from the previous year. The increase was mainly attributable to the increase of HK$6.32 million in salaries and HK$2.73 million in rental expenditure.

The total expenditure of the R&D projects amounted to HK$295,653,705, of which 68% of the expenditure was spent on manpower and 32% of the expenditure was spent on equipment and other direct costs. Total expenditure mainly represented the actual cash outflow incurred during the year for 67 full (platform and ICP) projects and 19 seed projects. Meanwhile, the internship expenditure amounted to HK$3,845,761, which represented the actual cash outflow of salary payment for interns engaged in 31 full projects.

The consolidated statements for the year ended 31 March 2012 of ASTRI and its subsidiaries, Hong Kong Jockey Club Institute of Chinese Medicine Limited and 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 on the following pages.

應科院在二零一一／一二年度，繼續以審慎的態度執行財務管理。本年度淨收入，在未計入稅項和回饋給政府的收益以前，總額為港幣10,202,402元。年內，應科院回饋給政府的收益合共港幣10,759,812元。

全年收入為港幣440,792,341元，當中來自政府款項包括經常性撥款港幣130,290,388元；創新及科技基金的研發經費港幣266,721,501元；創新及科技基金的一般支援計劃資助港幣414,870元及創新及科技基金的實習研究員計劃資助港幣3,845,761元，及業界直接投入研發項目的資金為港幣28,932,204元，總額與去年大致相若。同時，從業界所得的其他收入由二零一零／一一年度的港幣23,318,158元增加至二零一一／一二年度的港幣33,439,344元。增幅主要來自顧客負責全額研發費用的合約研究項目。

經常性撥款的總支出為港幣133,048,578元，比去年增加港幣9,971,449元。支出增加主要是由於薪酬開支增加了港幣632萬元及租金增加了港幣273萬元。

研發項目的總開支達港幣295,653,705元，當中68%用於人力資源、32%用於儀器及其他直接開支。總開支主要為六十七個正式項目（平台及業界合作項目）和十九個種子項目的實際現金支出。同時，實習研究員計劃支出為港幣3,845,761元，相當於實習研究員參與三十一個正式項目的實際薪酬支出。

應科院及其附屬機構香港賽馬會中藥研究院有限公司及應科院科技研究〈深圳〉有限公司全年截至二零一二年三月三十一日止的綜合賬目經由外聘核數師審計，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, 2012 截至二零一二年三月三十一日止年度)		2012 (HK$) 二零一二年(港幣)	2011 (HK$) 二零一一年(港幣)
Subvention	**資助**		
Income from Government subvention	政府資助收入	130,290,388	103,542,648
Administrative expenses	行政支出	(133,048,578)	(123,077,129)
Deficit on subvention	資助虧損	(2,758,190)	(19,534,481)
Project Funding from Innovation and Technology Fund and Industry Contribution	**創新及科技基金及業界投入資金**		
Project fund income	項目收入		
» Innovation and Technology Fund	» 創新及科技基金	266,721,501	263,567,503
» Industry contribution	» 業界投入資金	28,932,204	29,339,305
Project expenditure	項目支出	(295,653,705)	(292,906,808)
Balance on project funding	項目資金餘額	-	-
Project Fund Income - General Support Programme	**項目資金收入—一般支援計劃**		
» Innovation and Technology Fund	» 創新及科技基金	414,870	380,725
» Industry contribution	» 業界投入資金	50,172	87,350
Project expenditure	項目支出	(465,042)	(468,075)
Balance on project funding	項目資金餘額	-	-
Internship Funding from Innovation and Technology Fund	**創新及科技基金的實習研究員計劃基金**		
Internship fund income	實習研究員計劃資助收入	3,845,761	5,140,869
Internship expenditure	實習研究員計劃支出	(3,845,761)	(5,140,869)
Balance on internship funding	實習研究員計劃資助餘額	-	-
Project Funding from The Hong Kong Jockey Club	**香港賽馬會項目基金**		
Project fund income	項目資助收入	6,080,477	6,393,529
Project expenditure	項目支出	(6,080,477)	(6,393,529)
Balance on project funding	項目資助餘額	-	-
Other Net Income	**其他淨收入**		
Other income	其他收入	33,439,344	23,318,158
Other expenses	其他支出	(20,478,752)	(9,156,472)
Other net income	其他淨收入	12,960,592	14,161,686
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**	(10,759,812)	(11,145,987)

		2012 (HK$) 二零一二年(港幣)	2011 (HK$) 二零一一年(港幣)
Deficit Before Taxation	**稅前虧損**	(557,410)	(16,518,782)
Taxation Credit	**稅收抵免**	251,482	1,527,791
Deficit for the Year	**本年度虧損**	(305,928)	(14,990,991)
Other Comprehensive Income	**其他全面收入**		
Exchange difference arising on translation	外幣報表換算差額	20,248	28,365
Deficit and Total Comprehensive Expense for the Year	**本年度虧損及 全面總支出**	(285,680)	(14,962,626)
Deficit for the Year Attributable to	**本年度虧損分配於**		
Owners of the Company	公司擁有人	(291,634)	(14,974,423)
Non-controlling interests	非控股權益	(14,294)	(16,568)
		(305,928)	(14,990,991)
Total Comprehensive Expense for the Year Attributable to	**本年度全面總支出分配於**		
Owners of the Company	公司擁有人	(271,386)	(14,946,058)
Non-controlling interests	非控股權益	(14,294)	(16,568)
		(285,680)	(14,962,626)

Consolidated Statement of Financial Position
綜合財務狀況表

(At 31 March, 2012 於二零一二年三月三十一日)		2012 (HK$) 二零一二年(港幣)	2011 (HK$) 二零一一年(港幣)
Non-current asset	**非流動資產**		
Property, plant and equipment	物業，機器及設備	9,677,273	10,682,697
Current assets	**流動資產**		
Accounts and other receivables	賬戶及其他應收款項	13,003,562	14,196,324
Taxation recoverable	可退回稅項	109,311	-
Bank balances and cash	銀行結餘及現金	235,681,931	307,409,862
		248,794,804	321,606,186
Assets classified as held for sale	分類為待出售的資產	33,266	-
		248,828,070	321,606,186
Current liabilities	**流動負債**		
Accounts and other payables	賬戶及其他應付款項	38,641,786	37,344,180
Receipts in advance	預收款項	146,645,272	219,086,651
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	10,173,901	11,173,496
Amount due to The Hong Kong Jockey Club	香港賽馬會到期款項	1,013,094	2,092,289
Taxation payable	應付稅項	-	131,090
		196,474,053	269,827,706
Net current assets	**流動資產淨值**	52,354,017	51,778,480
Total assets less current liabilities	**總資產減流動負債**	62,031,290	62,461,177
Non-current liabilities	**非流動負債**		
Deferred taxation	遞延稅項	(619,620)	(763,827)
Net assets	**資產淨值**	61,411,670	61,697,350
Capital and reserves	**股本及儲備**		
Share capital	股本	2	2
Accumulated surplus	累計盈餘	61,346,796	61,638,430
Translation reserve	折算儲備	48,238	27,990
Equity attributable to owners of the Company	**本公司擁有人應佔權益**	61,395,036	61,666,422
Non-controlling interests	**非控股權益**	16,634	30,928
		61,411,670	61,697,350

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。

General Enquiries 一般查詢

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R&D Groups / Teams Enquiries 研發群組及小組查詢

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集成電路設計群組

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ASTRI Annual Report 2011/12 Feedback Form
應科院2011/12年年報意見收集

The Annual Report is an important publication in the communication between ASTRI and its stakeholders. To enhance the quality of our reporting, please let us have your views by filling in the feedback form and returning it to Corporate Communications Department by fax at (852)3406 2801 or by email at corporate@astri.org.

年報是應科院與客戶和大眾保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					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 and Corporate Governance 業績及企業管治	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

2) Your overall rating of this Annual Report is (Please tick ✓ in the box):
   你給這份年報的總評分為（請在適當位置加上✓號）：

   ○ Poor 差劣   ○ Fair 尚可   ○ Good 好   ○ Very Good 非常好   ○ Excellent 優秀

3) Any other comments / suggestions? 其他意見？

   _____

   _____

   _____

4) Your name and contact details (Please note your supply of personal data is on a voluntary basis):
   請留下姓名及聯絡方法（閣下請自行決定是否提供個人資料）：

   ○ Please tick ✓ in the box if you do not wish to receive promotional materials from ASTRI. 若閣下不欲收到應科院的宣傳資料，請在左方格加上✓號。

   Name 姓名：(Ms. 女士 / Mr. 先生) _____
   Company 公司：_____ Title 職位：_____
   Email 電郵：_____ Phone No. 電話：_____
   Address 地址：_____