

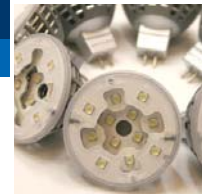
ASTRI's R&D Groups

Material & Packaging Technologies

High value-added manufacturing is crucial to Hong Kong because the Mainland's immediate technology ascent will largely concentrate in this area while the Pearl River Delta is a potential centre for information and communications technology (ICT) manufacturing. The Material and Packaging Technologies (MPT) Group focuses on developing high-value, next-generation products, devices and components that are differentiated by material and packaging technologies.

Introduction	32
Developments	34
Achievements	36
Project Highlights	37

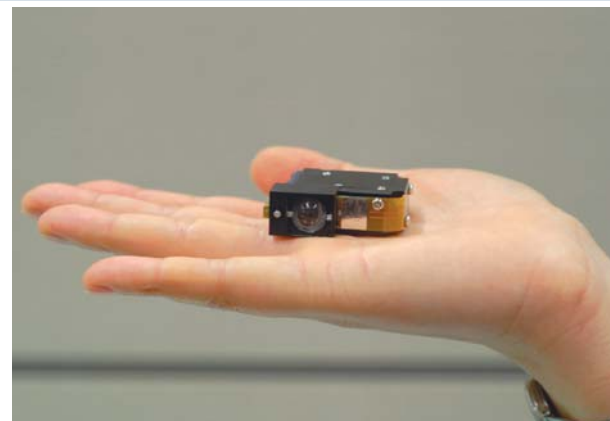
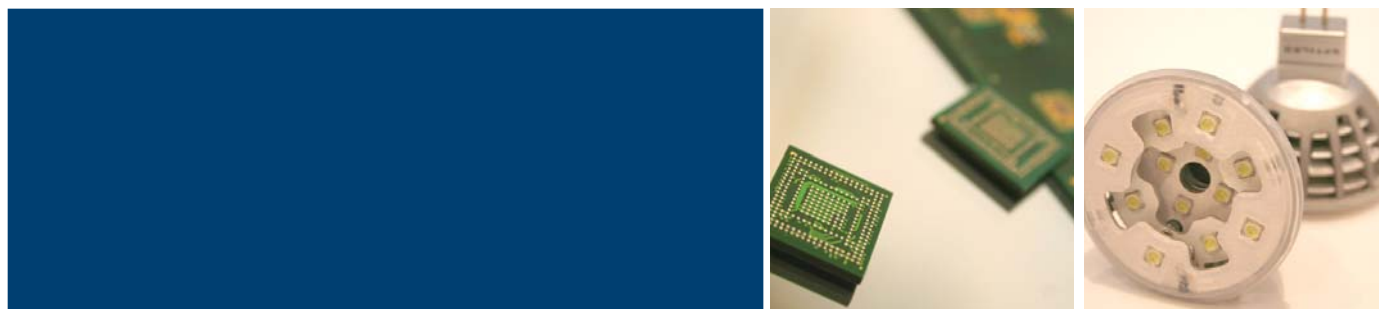
Material & Packaging Technologies



Introduction

MPT was established in 2005. Since then it has filed over 90 patents in its core technology and signed more than 35 industrial contracts for technology dissemination, which generated more than HK\$20 million of industry contributions. The licensees include key companies in the Greater China region, especially in Hong Kong and the Pearl River Delta.

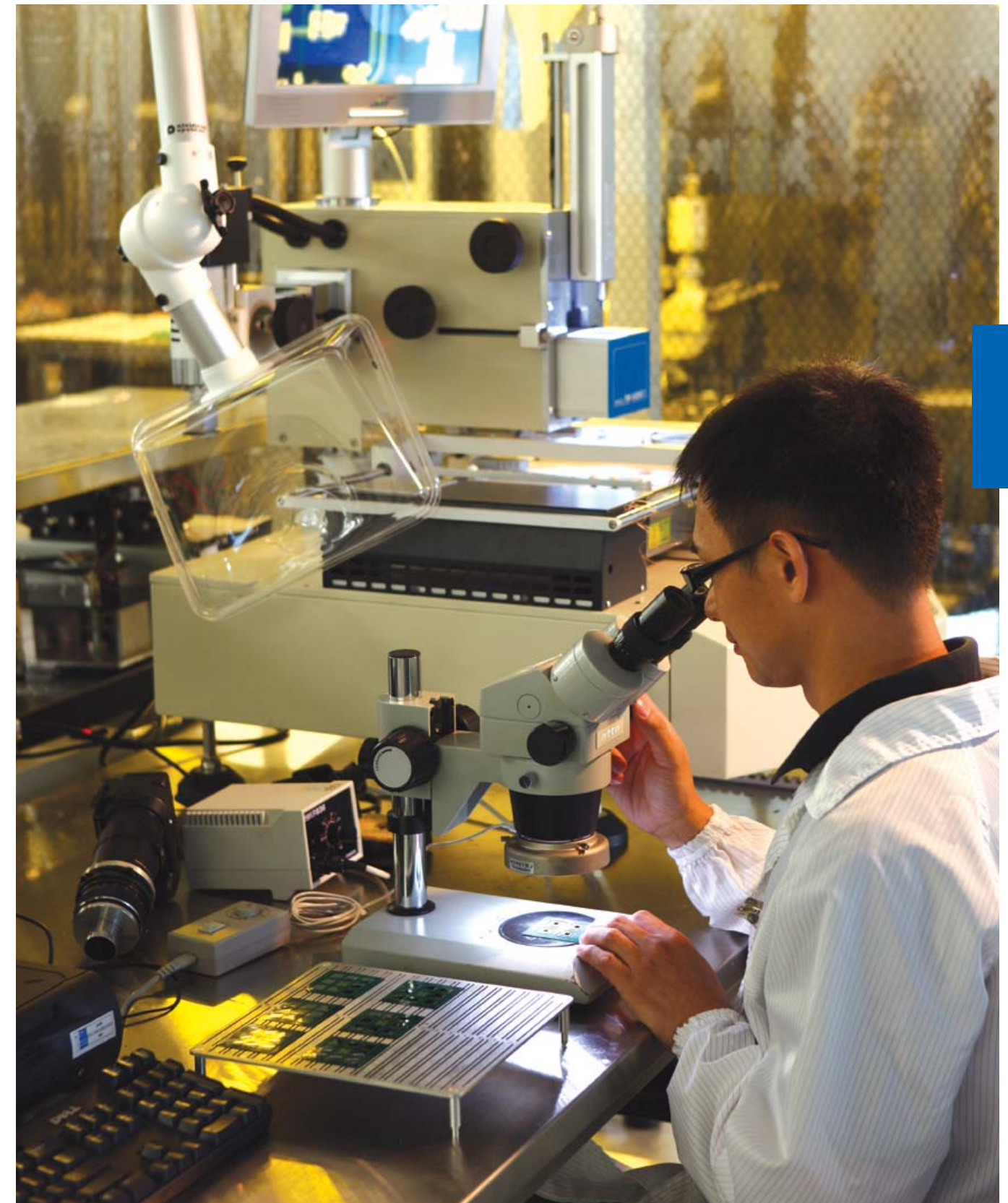
The group builds upon ASTRI's existing base in photonics research and has expanded its scope to develop applications that are promising for Hong Kong and the Pearl River Delta (PRD) region in areas such as next-generation solid state lighting, electronic packaging, photonic components, advanced displays and components etc. Building up material and packaging technology platforms will continuously spawn new and competitive applications in the long term. The goal of MPT is to lay the foundation for Hong Kong or the PRD to become a major centre for designing and manufacturing next-generation devices and key components in the ICT industries of Greater China.



01 02

03

- 01 CES award-winning System-in-Package
- 02 LED MR16
- 03 Pico Projector



Process control during prototype assembly of electronic package

Material & Packaging Technologies



Developments

The current R&D activities are focused on the following areas:

LED Technologies

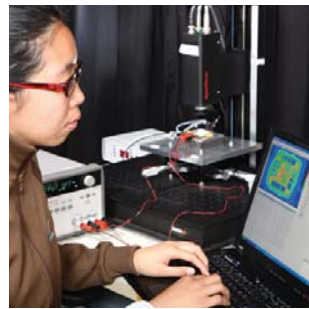
- LED chips, packaging, scanning mirrors, and their applications on TV and miniaturized projector systems and general lightings.

Advanced Packaging Technologies

- System-in-Package (SiP) based advanced packaging solutions for wireless, automotive and wearable electronics, including low-cost high-performance substrates, 3D packaging and energy harvesting;
- Formed a consortium with more than 25 companies mainly from Hong Kong and the Mainland.

Photonic Components

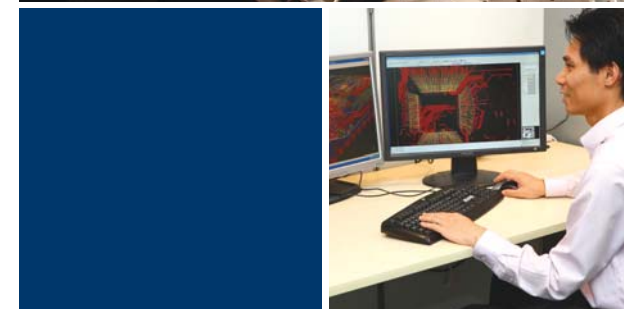
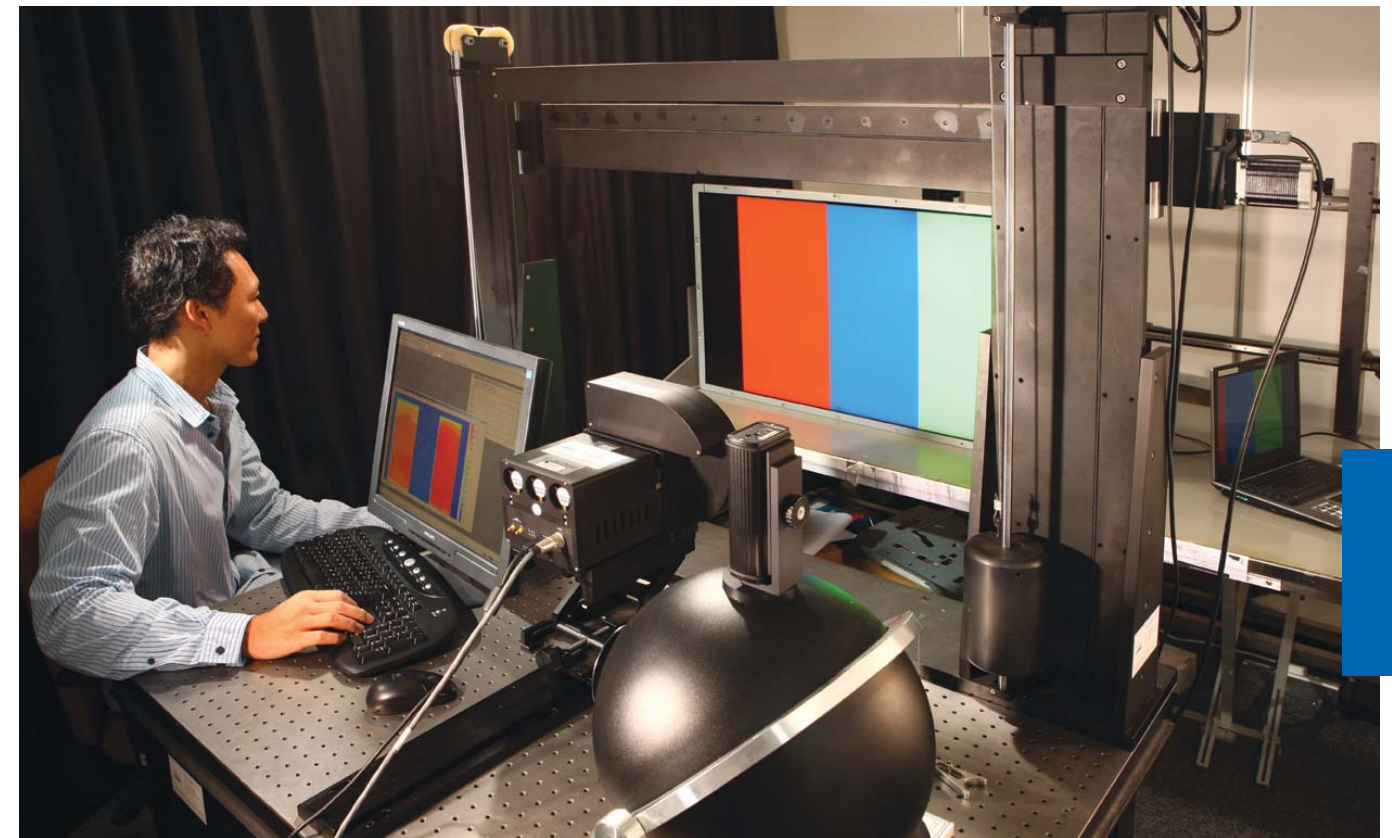
- Anti-shaking camera modules for cell phones, chip scale actuators for auto-focus camera modules, optical sensors, HDMI optical links and solar cells.



01

02

- 01 Non-contact temperature distribution measurement of an electronic package by using IR Microscope
- 02 Integrated Laboratory for LED General Lighting



01

02

03

- 01 Brightness and colour uniformity measurement for Flat Panel Display
- 02 Flexible wearable electronic module
- 03 Substrate design for advanced packaging

Material & Packaging Technologies



Achievements

During the year of the report, MPT embarked on the following technological developments:

High Dynamic Range (HDR) Display Technology

HDR is one of the key next-generation display technologies. MPT has developed the HDR-LCD display technology based on our "Active Dynamic LED Backlight" platform. So far, more than 10 international patents have been filed, and the technology has been licensed to four major companies in Hong Kong and the Mainland. Industrial contributions amounting to HK\$3.8 million have been generated.

Pico Projector

Developed by ASTRI, the "Personal portable LED micro-projector" has won the recognition of "innovative product" of the 2nd China National Solid State Lighting Innovation Contest. The size of the projector is equivalent to that of a piece of candy, about 20mm x 30mm x 13mm. When the projector is connected to the computer or mobile phone, it can project the best image size from 7 to 15 inches.

Ultra-thin LED Backlight with Local Dimming and Large-size Public Information Display LCD with Ultra-high Brightness, Environment-friendly and Power-saving Function

ASTRI's two other innovations, "Ultra-thin LED Backlight with Local Dimming" and "Large-size Public Information Display LCD with Ultra-high Brightness, Environment-friendly and Power-saving Function" also won awards. The aim of the contest was to encourage cooperation among universities, research institutes and enterprises in developing LED technology and applications to enhance competitiveness of the Mainland's solid state lighting industry.

High-power LED-based MR16 Spotlight

The high-power LED-based MR16 Spotlight incorporating two ASTRI IPs solves the heat spreading and dissipation problems. The LED lamp can inject more power for brighter light and is licensed to a Hong Kong company for mass production.

Cost-effective and Reliable Packaging Technologies for Tire Pressure Monitoring System (TPMS)

The above TPMS-related technologies provide a total solution for automotive electronics-related industries. The TPMS project can be used as a fine example for demonstrating the distinctive advantages for timely, cost-effective and reliable product implementation. Several international patents have been filed and more than HK\$4.6 million of industrial contribution has been committed.

Anti-shaking Compact Camera Module

This is an optical anti-shaking compact camera module for next-generation camera phone applications. This technology enables users to take clear and sharp photos or stable videos even under a shaky condition or inside a moving vehicle. This project has obtained development support from a tier-1 company and several international patents have been filed.

Project Highlights

	Project Name	Description	Date
1	High Dynamic Range (HDR) Display Technology	HDR is one of the key next-generation display technologies. ASTRI has developed the HDR-LCD display technology based on "Active Dynamic LED Backlight" platform, which includes filing more than 10 international patents, technology licensing to four Hong Kong and Mainland tier-1 companies, and receiving over HK\$3.8 million of industrial contribution.	Jun 07 ~ Nov 08
2	Pico Projector	For portable electronics embedded with projection function, ASTRI has successfully developed two modules using LCoS panel and LED sources with sizes of 15cc and 8cc respectively. This technology has won the "Innovation Product Award" of the 2nd China National Solid State Lighting Innovation Contest 2008.	Dec 07 ~ Jan 10
3	High-power LED-based MR16 Spotlight	The high-power LED-based MR16 spotlight incorporating two ASTRI's IPs solves heat spreading and dissipation problems. This LED lamp is able to inject more power for brighter light, and has been licensed to a Hong Kong company for mass production.	Sep 06 ~ Sep 08
4	Cost-effective and Reliable Packaging Technologies for Advanced Tire Pressure Monitoring System (TPMS)	The key technologies provide a total solution to automotive electronics-related industries. TPMS is used as a fine example for demonstrating the distinctive advantages based on the above technologies for timely, cost-effective and reliable product implementation. Several international patents have been filed and more than HK\$4.6 million of industrial contribution has been committed.	Mar 07 ~ Jul 10
5	Anti-shaking Compact Camera Module	We have developed an optical anti-shaking compact camera module for next-generation camera phone applications. This technology allows users to take clear photos or stable videos even under a shaky condition or in a moving car or train, and has obtained tier-1 company development support. Several international patents have been filed.	May 07 ~ Sep 09
6	Ultra-thin LED Backlight for LCD TV	This ultra-thin LED backlight with light mixing distance down to 15-25mm targets the slim LCD TV market. With the proprietary design of secondary optical components, these backlights could employ medium power to high power, white or red/green/blue LEDs. LCD TV with these backlights would reveal a more vivid color and brighter image.	Jun 07 ~ Nov 08

Project Highlights

	Project Name	Description	Date
7	Thin-film-based Vertical-LED Chips	This novel patented vertical-LED technology is licensed to two major LED chip makers in the Greater China region. More than 10 international patents have been filed, and more than HK\$2 million of industry contribution has been secured.	Mar 07 ~ Jul 09
8	A Design Advisor for Virtual Manufacturing and Qualification Testing of 3D Stacked Package	A design advisor is developed for development of 3D stacked packages, with which the entire manufacturing processes and qualification tests can be accurately modeled, the potential manufacturability and reliability related problems can be thus predicted. Furthermore, the root causes of the detected problems and recommendations can be provided by the model. Several international patents have been filed and there will be more than HK\$1.5M of industry contribution.	Jan 08 ~ Mar 10
9	System-in-Package Technology Platform	In the 2006 International Consumer Electronics Show (CES), one of our tier-1 customers received the CES Award in the area of computer peripherals, in which their product used ASTRI's System-in-Package solution to enable their product to win the award among thousands of participants. Several international patents have been filed with more than HK\$1.2M of industry contribution.	Sep 05 ~ Nov 07
10	Optical HDMI Cable	We developed the next-generation Optical HDMI cable based on the well-established optoelectronics platform and technologies. The cable has 3.4Gb/s/channel throughput (3 data channels) with fully functional control signal access and can reach transmission distance beyond 100m. The cable is HDMI 1.3b standard compatible with small form factor. This technology has been licensed to two Hong Kong-based tier-1 customers for commercialization, and a patent has been filed.	Dec 06 ~ May 08