



## NEW INDUSTRIALISATION AND INTELLIGENT MANUFACTURING

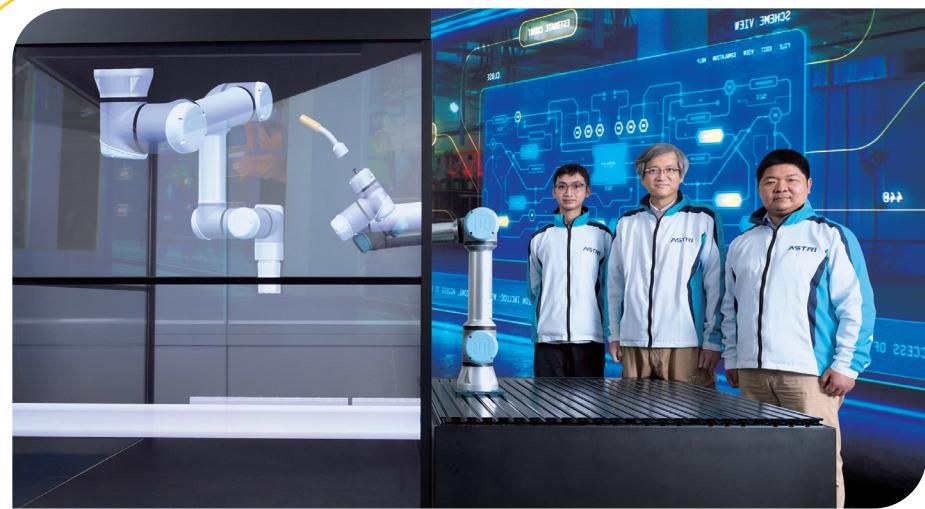
### 新型工業化及智能製造

New industrialisation was a key initiative outlined in 2024 Policy Address, reflecting the HKSAR Government's commitment to driving advanced manufacturing through technology. ASTRI is at the forefront of developing and deploying cutting-edge technologies to help Hong Kong transform into a regional centre for intelligent manufacturing and industrial innovation.

新型工業化是香港特區政府《2024年施政報告》的重點政策，反映政府致力以科技驅動高效先進製造業的發展。應科院站在最前線開發和部署尖端技術，助力香港轉型發展為區內智能製造及工業創新中心。

We are enabling the creation of interconnected, fully digitalised smart factories that seamlessly integrate artificial intelligence and robotics to deliver highly efficient, reliable and sustainable operations. By driving industrial progress, ASTRI is supporting Hong Kong's emergence as a smart city, enhancing research and development capabilities, and improving production efficiency across the manufacturing sector.

我們正推動建構互聯、全數碼化的智慧工廠科技，融合人工智能及機械人技術，以實現高效、可靠及可持續的營運。透過推動工業進步，應科院支持香港發展成為智慧城市，提升研發能力，並改善製造業整體的生產效率。



ASTRI leverages Model-Based Systems Engineering to develop digital and physical twins, revolutionising autonomous robotics with real-time risk prediction, adaptability, and operational integrity in dynamic, mission-critical environments. 應科院運用模型化系統工程開發數位孿生和實體孿生，革新自主機器人技術，具備即時風險預測、適應和完整操作的能力，能夠在動態且危險的環境中執行任務。

## Research Areas & Focus 研究領域與重點



## Technologies Breakthrough 技術突破

In 2024/25, ASTRI continued to drive innovation in smart connectivity, leveraging advanced technologies to enable intelligent networks and enhance operational efficiency across industries. By integrating cutting-edge solutions into smart manufacturing, logistics, and environmental monitoring, ASTRI remains at the forefront of efforts to build Hong Kong into a world-class smart city.



By advancing these technologies, ASTRI is driving the adoption of intelligent systems that enhance operational efficiency, environmental sustainability, and industrial innovation, strengthening Hong Kong's competitiveness in smart manufacturing.

透過推動這些技術發展，應科院促進智能系統的採用，以提升運作效率、促進環境可持續發展及推動產業創新，加強香港在智能製造方面的競爭力。

於2024/25年度，應科院持續推進智慧網絡不斷創新，更以先進技術實現智能網絡，及提升各行業的營運效率。應科院將創新解決方案整合至智能製造、物流及環境監測領域，繼續引領香港邁向世界級智慧城市。

### Cloud-based Robot Management Platform

Just as factories rely on managers to oversee workers and allocate tasks, smart factories need a centralised system to manage robots and ensure efficient task execution. ASTRI's proprietary Cloud-based Robot Management Platform can coordinate and manage over 100 robots simultaneously. This advanced platform empowers robots to "execute, think, and adapt" in real-time, delivering unparalleled flexibility and efficiency for modern smart factories. It can also be applied in logistics warehouses, smart offices and other scenarios.

### 雲機器人管理調度平台

正如工廠需要廠長管理工人分配工作，智能工廠亦需要中央管理平台，確保機器人順利執行任務。應科院自主研發的「雲機器人管理調度平台」，能同時協同管理超過100台機器人，讓它們「邊執行、邊思考、邊適應」，令智能工廠更靈活高效。這個平台還可以在不同場景應用，例如物流倉儲和智能辦公室。

### Automated Diamond Colour Grading

ASTRI developed a high-precision automated diamond colour grading machine utilises internal reference standards to eliminate environmental and human errors, achieving an accuracy of  $\pm 0.5$  grade. This innovative technology enables continuous diamond colour evaluation on production lines, simplify workflows and address the inefficiencies of traditional grading methods, setting a new benchmark for the industry.

### 鑽石顏色自動分級

應科院研發了高精密自動化鑽石顏色分級機器，利用內部參照標準，消除環境和人工誤差，令準確率高達正負0.5級。這創新技術能夠在生產線上連續評估鑽石顏色，簡化生產線流程，解決傳統分級的低效問題，為行業樹立新基準。

### Lifelong AI Learning for Smart Manufacturing and Logistics

To support dynamic industrial requirements, ASTRI developed lifelong AI technology capable of handling both data incremental and class incremental scenarios. Integrated into the ASTRI Machine Vision platform, this innovation enhances ASTRI's intellectual property in defect inspection, providing robust AI-driven solutions for smart manufacturing and logistics.

### 智能製造及物流的終身人工智能學習

為配合動態工業需求，應科院開發了支援數據增量及分類增量場景的終身人工智能技術，並已整合至應科院機器視覺平台，不僅可鞏固應科院在缺陷檢測領域之知識產權，亦為智能製造及物流領域提供更強大的人工智能解決方案。

## Partnership and Commercialisation

### 合作夥伴及市場化項目

#### Collaboration in High-End Semiconductor Inspection Technology

##### 高端半導體檢測技術合作

We partnered with leading companies in Hong Kong and Chinese Mainland, including Supergold, Vega, Motic, and i-Sense, to integrate our coaxial confocal line-scan technology into their existing semiconductor inspection and microscopy equipment. This technology has also been adopted as a standard sensor in some applications.

As part of the collaboration, we developed multiple models with varying specifications to address the diverse application needs of different customers and scenarios. Several manufacturers have already commenced small-scale production, demonstrating the adaptability and market readiness of this innovative technology.

我們與香港及中國內地多家領先企業合作，包括Supergold、Vega、Motic及中科慧儀 (i-Sense)，將應科院的同軸共焦線掃描技術整合至其現有半導體檢測及顯微鏡成像設備中，在部分應用中更成為標準傳感器。

合作期間，我們開發了多款規格各異的型號，以滿足不同客戶及場景的多元應用需求。部分製造商已展開小規模生產，足證此創新技術靈活多變並具備條件推出市場。

#### Project commenced in 2024/25\*

##### 2024/25年度開展的研發項目\*

Enabling Intelligence and Autonomation for 5G and Beyond Private Networks Operations	實現5G及未來專用網絡運維自智化
Lifelong AI Learning for Smart Manufacturing and Logistics	用於智能製造和物流的終身人工智能學習
Design and Fabrication of Narrowband Metalens for Mobile 3D Sensing	移動3D感測超透鏡的設計與加工
Dynamic Hybrid-frequency Spatial-carrier Deflectometry Based 3D Inspection System	基於動態混合頻率空間載波偏折術的3D檢測系統
3D Metrology & Inspection System Generic for Industrial Verticals	用於工業場景的3D測量與檢測系統

\* Funded by the Innovation and Technology Fund

\* 創新及科技基金資助