

How ASTRI enables Hong Kong to get the most out of 5G's huge potential 應科院推動 5G 大潛力令香港獲益更多

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The incredible power of 5G has arrived, creating huge scope in terms of smart city capabilities, automation and communication technologies. It has the potential to change our lives in so many positive ways and the Hong Kong Applied Science and Technology Research Institute (ASTRI) is perfectly placed to ensure our city gets the most of these opportunities, making our home smarter and safer.

ASTRI recently achieved a significant milestone in developing a full set of 5G technology solutions including high-performance 5G core networks and pioneering O-RAN 5G base stations.

Thanks to virtualization and open architecture, ASTRI has simplified 5G network solutions, allowing them to be adjusted according to a business's needs – including capacity and size of equipment. The innovation greatly reduces the cost of 5G equipment and facilitates flexible deployment for enterprises. The innovative EASY 5G concept launched by ASTRI will change the deployment concept of traditional networks, simplifying complexity and truly achieving 5G in your hands.

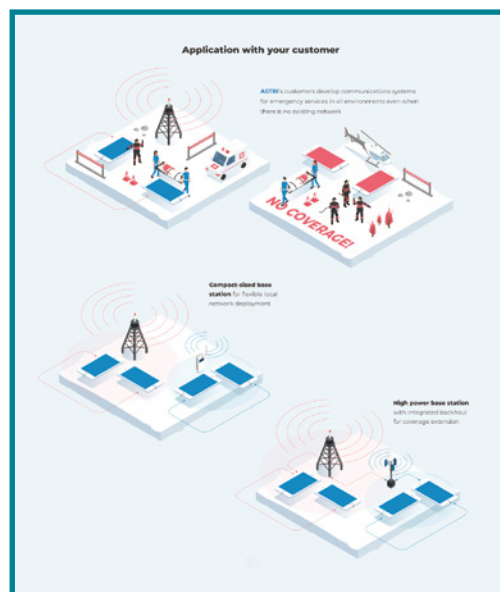
ASTRI's 5G technology and architecture solutions will bring significant savings to Hong Kong's businesses, helping to break down a traditional barrier to adoption when it comes to cutting-edge telecommunications equipment. As one of our city's early movers in 5G research and commercial applications, ASTRI has more than a hundred experts developing its 5G technology. Numerous research projects have been conducted and ASTRI's open platform solutions are available to businesses at a fraction of the cost of developing their own technologies.

5G 時代經已來臨，其強大的功能促進了智慧城市、工業自動化和通訊技術的發展，並影響和改變著我們的生活。香港應用科技研究院（應科院）致力於推動創新科研，推動我們的城市充分利用 5G 帶來的機遇，讓我們的家居環境變得更智慧和安全。

最近，應科院的 5G 技術開發實現了重要的里程碑，能夠提供包括高性能的 5G 核心網絡和創新的 5G O-RAN 開放式基站的一整套 5G 技術解決方案。

受惠於虛擬化技術和開放式架構，應科院簡化了 5G 網絡設備解決方案，從設備的容量和規模上都可以根據需要來進行調整。其技術創新大大降低了 5G 設備的成本，亦能促進企業網絡的靈活部署。應科院推出的創新 EASY 5G 概念簡化了傳統網絡的部署，更讓 5G 能真正地在您們手中實現。

應科院的 5G 技術和架構方案將為本港企業提供低成本解決方案，解決企業在遇上尖端電訊設備時無法採用的傳統障礙。作為本港 5G 研究和商業應用的先驅之一，應科院擁有逾百名相關技術研發專家，並開展了大量科研項目，而應科院的 5G 開放式平臺方案可供企業使用，成本遠低於由企業自行開發有關技術。



Hong Kong's 5G ecosystem

ASTRI's solution, developed locally but applicable globally, uses O-RAN, an open network architecture platform with standard configuration hardware to keep costs down and make integration easier. The end-to-end solution covers core, base stations, terminals and all other parts to provide comprehensive and tailor-made applications.

Mr Stephen Ho, Honorary Chairman of the CAHK, said: "The CAHK plays a vital role in Hong Kong's 5G ecosystem, working alongside our city's largest R&D organisation, ASTRI. Four mobile networks in Hong Kong are transitioning their current 4G networks into 5G and other mobile virtual network operators (MVNOs) are also interested in providing 5G. Collectively, we are all striving to maintain Hong Kong's position as a pre-eminent communications centre."

But just what are the actual changes businesses can see through 5G networks? There is also the lower latency, with data able to travel from source to destination in 1 millisecond (ms) compared with 50ms on 4G and the massive IoT range of a million devices per sq km compared with 50,000 on 4G. And of course, the speed, making it possible to download an 8GB high-resolution movie in only four seconds – compared with the 26 hours or 6 minutes at 3G and 4G speeds respectively. With all these factors, the potential goes way beyond entertainment on immediate demand or more complex games and can change every aspect of our lives.

New avenues in road automation

Thanks to the ultra-low latency, the power of 5G will open new roads in connected vehicle technology. Our cellular vehicle-to-everything (C-V2X) technology, which will enhance road safety, providing drivers with alerts about other vehicles or nearby pedestrians, as well as real-time information about traffic situations and roadside infrastructure such as traffic lights, lanes and approaching emergency vehicles. This technology will start being tested on a 14km area around Sha Tin city centre in early 2021 which will be the largest in-city C-V2X testbed in the region. Progressing this technology from a separate direction is our autonomous car, usually parked outside ASTRI's office in Science Park. Tap your desired destination on a tablet mounted on the dashboard, and sit back and enjoy the ride, as the car navigates around all obstacles in its way. This is an important landmark on the journey to a full driverless future.

Eventually these technologies will converge, through a vehicle-roadside infrastructure collaborative network, to create the automated superhighways of our future. It will open up a host of

香港 5G 的生態系統

應科院解決方案在本地研發並適用於全球範圍，它採用的 O-RAN 制式是一個在標準配置硬體上運行的開放式網絡架構平臺，可降低成本並易於系統集成。這個端到端的解決方案涵蓋核心網絡、機站、終端等所有部分，提供全面和度身訂造的應用專案。

香港通訊業聯會榮譽主席何偉中先生說：「香港通訊業聯會與本港最大的科研機構應科院合作，在香港的 5G 生態系統中發揮至關重要的作用。在香港，四個流動網絡營辦商正在將現時的 4G 網絡過渡至 5G 網絡，而其他流動虛擬網絡營辦商也有興趣提供 5G 服務。總括來說，我們正共同努力以維持香港作為通訊樞紐的卓越地位。」

然而，企業可通過 5G 網絡看到哪些實際變化呢？那就是其更低延遲性：在 5G 網絡，數據從源頭傳輸到終點僅是 1 毫秒的延遲，而 4G 則為 50 毫秒；在 5G 網絡，每平方公里可配置龐大的 100 萬個物聯網設備，而 4G 則僅為 5 萬個。當然還有其傳輸速度：使用 5G，下載 8GB 高解析度電影約只需要 4 秒；而使用 3G 和 4G 下載，分別需要 26 小時或 6 分鐘。所有這些因素，讓 5G 的發展潛力遠遠超越了人們對娛樂的即時需求或者更複雜的遊戲。5G 正在改變我們生活的每一面。



邁向道路自動化之路

基於超低延時的特性，5G 的強大功能將在車聯網技術中開闢出新道路。我們的流動車聯網 (C-V2X) 技術能提升道路安全，當其他汽車或附近行人對聯網汽車構成影響時，系統會向駕駛者發出警示；因應交通環境、路邊基礎設施如交通燈信號、車道狀況以及緊急救援車輛的靠近等，系統都能給駕駛者提供實時訊息。這項技術將於 2021 年初在沙田市中心 14 公里道路範圍內進行測試，將會是本港最大型的地區性流動車聯網試行計劃。

這項技術的另一發展方向是開發自動駕駛汽車。我們研發的自動駕駛汽車通常停泊在應科院位於科學園的辦公大樓外面，乘客上車後只要在儀錶板上的平板顯示器上點選目的地，就可以安坐車內享受旅程，因為汽車導航會繞過所有障礙物。這項研發是邁向未來全自動無人駕駛的一個重要里程碑。

最終，這些科技將結合起來，通過汽車與路邊基礎設施協作網絡，加速未來的自動化高速公路的發展。亦能協助開拓與通信相關的眾多行業。通過道路交通狀況數碼化和交流實時訊息，可以檢測和警告復

related industries in relation to communications. By digitalising the road traffic in real-time it can alert threats on complicated road situations and proactively manage traffic to enhance the safety and traffic efficiency. Future automated mobility will take us wherever we want to go with safe and comfortable experience.



雜道路情況下的威脅，並主動管理交通，以提高安全性和交通效率。未來的道路自動化，將為我們的出行帶來更安全更舒適的體驗。

From AGVs to critical communication

The potential of automated vehicles goes way beyond just transporting us safely and comfortably. Automated Guided Vehicles (AGVs) are being deployed in dark factories and warehouses, able to manoeuvre their way through the factory floor, park by themselves and pick up and put down objects. They can perform remote inspection in hard-to-reach areas such as train tunnels or far-flung parts of the city, allowing more efficiency in the deployment of experts who can remain in a central command centre with a crystal-clear view of the situation on the ground through AR headsets mounted with 360-degree cameras.

ASTRI's technology has already been commercialised by Taiwanese IT giant, Foxconn, whose subsidiary, Foxconn Industrial Internet, has an AGV using camera images from the vehicle's roof for instant positioning through private 5G network in order to direct the vehicle's movement in factories.

Our technology is not just about making your daily life safer and more efficient, it can also help rescue you from danger in an emergency. Together with the China Electronics Technology Group Corporation (CETC), we developed the B-TrunC mission critical communications system that can be quickly deployed by first responders in the air or over land, with minimal network planning required.

Within an hour, it is possible to build an emergency communication network which can cover a range of more than 30 square kilometres with air-base station and at the same time allow dozens of mobile phones to get internet connection. The solution offers high availability and low end-to-end delay, enabling video and voice communications between first responders and a control centre. It has been commercialised in Israel and mainland China and Hong Kong's Fire Services Department is also evaluating its applicability to assist in search and rescue operations.

This is just the very beginning of our 5G journey and a mere glimpse at the technology that it will make possible. As it develops, we will see more and more innovation bring greater security, safety and efficiency to our lives and, as always, our hard-working and entrepreneurial city will lead from the front. ●

從自動導引運輸車到應急通訊系統

自動化車輛的潛力不只局限於把我們安全舒適地送達目的地。自動導引運輸車還可以在智慧工廠和倉庫中使用，於工廠裡自動操控行駛、停泊和上落貨物。它們能夠接近人們通常難以到達的地方，例如火車隧道或城市偏遠地區，進行遠程檢查，從而提高專家的效率。專家只需留在中央指揮中心，通過 360 度全景相機的擴增實境 (AR) 頭戴裝置配備，清晰瞭解到該地方的情況，提高效率。

應科院的技術已被台灣訊息技術巨頭富士康採用，其附屬公司富士康工業互聯網股份有限公司擁有一輛自動導引運輸車，該車使用車頂的鏡頭影像通過專屬 5G 網絡，協助車輛即時定位，以指導該導引運輸車在工廠中自動行駛。

我們的技術不僅可以讓您的生活更安全、更有效率，還可以在緊急情況下避免危險。我們與中國電子科技集團有限公司合作研發了寬頻集群通信 (B-TrunC) 應急通訊系統，該系統只需要極小網絡規劃及設置，已可在空中或陸地供先遣急救隊員使用。

應急通訊系統網絡可以在一個小時內建立，通過部署空中基站，這個網絡可以覆蓋逾 30 平方公里範圍，並可同時供數十部手提電話接達互聯網。這個解決方案提供高可用性和端到端低時延，讓先遣急救隊員與控制中心能進行視像和語音通訊。這項技術在以色列和中國大陸已實行商品化，而香港消防處也在評估是否適用於搜索和救援行動中。

這只是我們 5G 旅程的開始，其發展充滿更多可能性。隨著 5G 的面世，我們預見有越來越多的創新技術，給人們的生活帶來更大的保障、更安全及更高效率。香港是個努力不懈和充滿企業精神的都市，我們將秉承此優勢，繼續引領向前。 ●

