



## 為港珠澳大橋香港口岸推出智能化路線圖 Launch of the Intelligent Roadmap for Hong Kong-Zhuhai-Macao Bridge Hong Kong Port

隨着有關智慧城市發展、碳中和及「港車北上、粵車南下」的政策相繼實施，機電工程署(機電署)於2023年5月為港珠澳大橋香港口岸(口岸)推出智能化路線圖，主動為客戶部門研發及應用智能機電方案，積極推動口岸邁向智能過境、智能資產管理和碳中和。

With the successive implementation of policies relating to smart city development, carbon neutrality and Northbound/Southbound Travel for Hong Kong/Mainland/Macao Vehicles, the Electrical and Mechanical Services Department (EMSD) launched an intelligent roadmap for the Hong Kong-Zhuhai-Macao Bridge Hong Kong Port (the Port) in May 2023, actively promoting smart crossing, smart asset management and carbon neutrality at the Port by developing and applying intelligent electrical and mechanical (E&M) solutions for client departments.

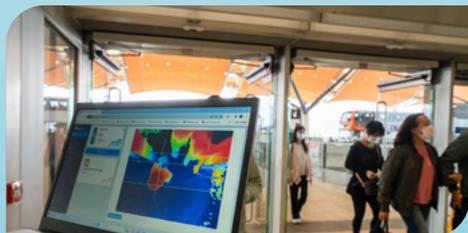
在智能過境方面，機電署正為口岸的車輛自動清關支援系統進行升級。升級後的系統可辨識粵港澳三地車牌，讓大灣區的駕駛人士均可順暢通行。首階段有關半自動操作模式的設計概念驗證已經完成，而第二階段的自動化系統升級現正全速進行，預計在今年第三季完成。機電署亦於旅檢大樓為客戶開發人工智能客流監測及影像分析系統，讓管理人員可實時監察客流狀況，從而加強保安及人流管制；系統將同時連接空氣處理機組和區域製冷機組，根據客流數據調節製冷水流量和送風量及溫度，實現綜合人流管制和智能空調配送。



第二階段的車輛自動清關支援系統升級工程現正全速進行，預計於今年內第三季完成，進一步優化粵港澳大灣區的車輛通關流程。

The second phase of the AVCSS upgrade is in full swing and is expected to be completed in the third quarter of the year, further optimising the clearance process of vehicles in the Guangdong-Hong Kong-Macao GBA.

Regarding smart crossing, the EMSD is now upgrading the Automatic Vehicle Clearance Support System (AVCSS) for the Port. The upgraded system can recognise licence plates of vehicles from Guangdong, Hong Kong and Macao, allowing smooth passage for drivers in the Greater Bay Area (GBA). The proof of concept for the semi-automatic operation in the first phase has been completed. The automated system upgrade in the second phase is currently in full swing and is expected to be completed in the third quarter of this year. In addition, the EMSD has developed for clients an artificial intelligent (AI) passenger flow monitoring and image analytics system in the Passenger Clearance Building (PCB), enabling real-time monitoring of the passenger flow by management staff, thereby strengthening security and crowd control; the system, which will also be connected to the air-handling unit and district chiller plants, adjusts the chilled water flow rate as well as the supply air volume and temperature based on passenger flow data, thus realising integrated crowd control and intelligent air-conditioning control.



人工智能客流監測及影像分析系統可實時分析出入境客流數據，從而提高管理效率。

The AI passenger flow monitoring and image analytics system is capable of analysing the data on inbound and outbound passenger flow in real time, thereby enhancing management efficiency.



在智能資產管理方面，機電署高級工程師區子威先生說：「我們秉持『治未病』的方針，運用創新科技(創科)在口岸實踐智能資產管理。」駐場團隊除了應用建築信息模擬技術以解決日常工程問題外，還先後為機電設施維修大樓及路政署行政大樓的兩台乘客升降機加裝智能升降機移動監測裝置，又為旅檢大樓的兩台自動梯加裝智能數碼自動梯監測系統，實時監察設施的運作狀況，以提升其安全水平。團隊亦率先研發智能鎮流器溫度傳感裝置，覆蓋地下設施管道20多個照明裝置，透過機械學習實時偵測鎮流器的溫度變化，遙距監察在高危地點照明裝置的狀況。以上三項創科方案均由機電署自主研發，並已獲得或已申請多個本地及國際獎項和短期專利。另外，機電署已為五個電箱加裝智能鎖，並會引入虛擬實境技術，讓工程人員在虛擬環境中接受安全培訓，提高工地安全意識。

智能鎮流器溫度傳感裝置可遙距監察偏僻地區、天橋隧道及密閉空間內照明裝置的狀況，從而提高維修保養效率，減少意外發生。

The i-BTSD enables remote monitoring of the condition of lighting installations in remote areas, bridges and tunnels, as well as confined spaces, thereby enhancing the maintenance efficiency and minimising accidents.



In terms of smart asset management, Mr William Au, Senior Engineer of the EMSD, said, "In line with the approach of prevention, we have implemented smart asset management at the Port with the use of innovation and technology (I&T)." Apart from applying Building Information Modelling technology to address day-to-day engineering issues, the on-site team has installed the Intelligent Elevator Movement Surveillance Device for two passenger elevators in the E&M Maintenance Building and the Administration Building of the Highways Department, as well as the Intelligent Digital Escalator Monitoring System for two escalators in the PCB, in order to monitor the operation of the facilities in real time, which in turn enhances their safety level. Besides, the team has pioneered the development of the Intelligent Ballast Temperature Sensing Device (i-BTSD), covering more than 20 lighting installations in the underground facilities network, which detects the temperature change of ballasts in real time through machine learning for remote monitoring of the condition of the lighting installations at high-risk locations. Self-developed by the EMSD, the above three I&T solutions have won or applied for several local and international awards as well as short-term patents. Besides, the EMSD has installed smart locks on five electrical pillar boxes, and will introduce virtual reality technology for workers to receive safety training in a virtual environment, increasing their awareness of site safety.



機電署為口岸的區域供冷系統開發人工智能系統，推動香港達至碳中和。

The EMSD developed an AI system for the DCS at the Port to contribute to the achievement of carbon neutrality for Hong Kong.

為推動香港達至碳中和，我們由去年8月起為口岸的區域供冷系統開發人工智能技術，分析和調節製冷機組的開關以及在口岸數十幢建築物的冷水分配，預計每年平均可節省約二百萬度電；未來計劃擴展應用至海水冷卻系統和熱交換系統，進一步節能減排。此外，我們逐步實施多個可再生能源方案，包括自行研發的太陽能海水處理系統、太陽能電動車充電系統等，以期達至「營運零排放」的長遠目標。

To promote carbon neutrality in Hong Kong, we have been developing an AI technology for the district cooling system (DCS) of the Port since August last year, which is capable of analysing and regulating the switching on and off of chiller plants as well as the distribution of chilled water to several dozen buildings at the Port. It is estimated that an average of around two million kWh of electricity can be saved annually. In the future, we plan to extend the application to seawater cooling systems and heat exchange systems to further save energy and reduce emissions. In addition, we have been progressively implementing various renewable energy solutions, including the self-developed solar power seawater treatment system, the solar power electric vehicle charging system, etc., with a view to achieving the long-term goal of zero emissions from operations.

我們積極落實機電工程營運基金第三個五年策略計劃，透過提供智能化機電服務，協助客戶部門提升工作效率和加強節能設備，促進實現碳中和的願景。為進一步加強多方創新協作，我們更舉辦一系列創新技術應用的專題活動，帶動客戶參與創科發展，促進更多創科方案落地。

We are proactive in implementing the third Five-year Strategic Plan of the Electrical and Mechanical Services Trading Fund by providing intelligent E&M services and assisting client departments in enhancing their efficiency and energy-saving equipment, so as to promote the realisation of the vision of carbon neutrality. To further strengthen innovation collaboration between stakeholders, we have organised a series of thematic activities on the application of innovative technologies, with a view to gaining clients' involvement in I&T development, as well as facilitating the implementation of more I&T solutions.



我們在今年1月12日於機電署總部舉行創新技術解決方案研討會暨工作坊，並邀請多個客戶部門出席；活動內容包括研討會、工作坊及參觀。

The Value-added I&T Solutions Seminar cum Workshop was held on 12 January 2024 at the EMSD Headquarters, and several client departments were invited to join. The event includes seminar, connection workshop and visit.