機電 E&M 2.0 服務新里程 A New Journey

機電工程營運基金第二個五年策略計劃
Electrical and Mechancial Services Trading Fund
The 2nd 5-year Strategic Plan

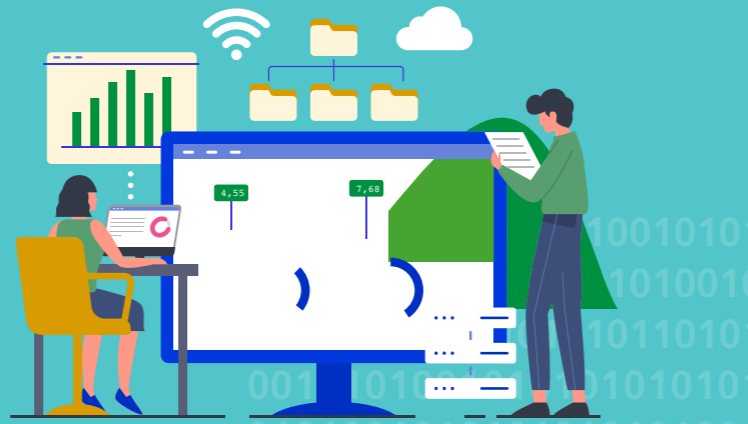最新進展
Latest Progress

2020 年 11 月
November 2020

機電工程署
EMSD

制訂數碼化工程方案
Developing Digitised E&M Engineering Solutions

深化協作 實踐數碼化
Deepen Collaboration, Implementing Digitisation

政府物聯通
Government-Wide Internet-of-Things Network

機電工程署(機電署)現正積極拓展政府物聯通 (Government-Wide Internet-of-Things Network, GWIN),為我們保養的機電設備安裝各種感應器和通訊閘來收集設備的運作數據,供分析和診斷之用,從而減少設備的不確定性,達致預測性保養維修的目標。截至2020年8月,機電署已為渠務署、康樂及文化事務署、水務署和土木工程拓展署等政府部門安裝不同的感應器,並已與超過100部物聯網通訊閘配對。GWIN可望於數月內覆蓋沙田及九龍東八成地區。

GWIN 的運作概念
The Concepts of Operations for GWIN

GWIN 採用長距離的物聯網通訊科技 LoRa (Long Range),配備以電池推動的感應器,具有覆蓋廣、耗電少、成本低及易於安裝等優點,並且具備網絡接駁及數據保安的設計。於日常運作上,機電署與渠務署防洪組合作,試用政府物聯通(GWIN)在沙田和大埔安裝多個低功耗 LoRa 水位傳感器(sensor),並於初步測試後在全港十多個較易受風暴而影響的岸邊及河邊進行更多試驗。

LoRa 水位傳感器全港分佈圖
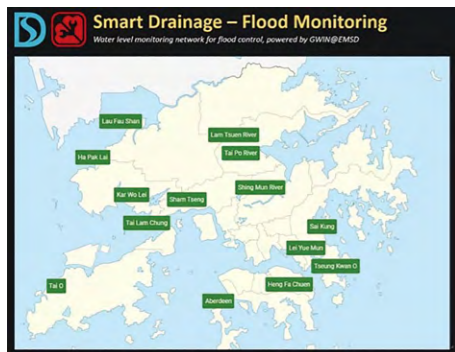**LoRa Water Level Sensor Distribution over Hong Kong**

The Electrical and Mechanical Services Department (EMSD) is currently expanding the Government-Wide Internet-of-Things Network (GWIN) by installing different sensors and gateways on E&M equipment under our maintenance. The sensors and gateways are used to collect operating data for analysis and diagnosis, so as to reduce the equipment's uncertainties and accomplish the purpose of preventive maintenance. As of August 2020, the EMSD have installed different sensors for the Drainage Services Department (DSD), Leisure and Cultural Services Department (LCSD), Water Services Department (WSD) and Civil Engineering and Development Department (CEDD), and have paired with over 100 Internet of Things (IoT) gateways. GWIN is expected to cover 80% of Sha Tin and Kowloon East Districts in the coming few months.

GWIN adopts the long range (LoRa) IoT communication technology with battery-operated sensors. Its advantages include wide-range coverage, low power consumption, low cost and easy installation, along with design for internet access and data security. For daily operation, the EMSD launched a trial scheme to develop a Real-time flood monitoring system through the application of the GWIN with the Land Drainage Division of DSD by installing the LoRa water level sensors at Shatin, Taipo and over 10 other strategic locations in Hong Kong.

安裝在大欖涌聯安新村的 LoRa 水位傳感器
LoRa Water Level Sensor Installation at Luen On Sun Tsuen in Tai Lam Chung

疫情肆虐障礙多 網上面試創先河
New Online Interview Arrangement to Overcome Challenges Posed by the Epidemic

面對反覆不定的 2019 冠狀病毒病疫情,機電署決定突破政府的傳統面試框架,參考並改良業界的做法,建立全新的網上面試系統,利用數碼科技減少社交接觸,從而維持評審效率。
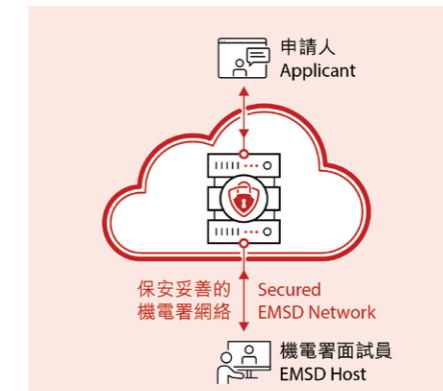
由於招聘資料為限閱文件,我們在機電署的數據中心安裝了一套網上會議系統軟件模組,經由內部伺服器處理所有須予保密的面試資料,免遭外洩。資訊保安稽核顧問、政府資訊科技總監辦公室和個人資料私隱專員公署經審視系統後均表示滿意。

In view of the uncertainties surrounding the Coronavirus Diseases 2019 (COVID-19) epidemic, the EMSD has made a breakthrough in the traditional government interview format by establishing a new online interview system with reference to the practice of the trades and further enhancements, thereby maintaining social distancing without compromising screening efficiency.

As the content of our recruitment exercise was restricted, we installed a set of software modules of a web conferencing system at our data centre, where all confidential interview data was processed through our internal server to avoid data leakage. Upon examination, the Advisory for Information Security, the Office of the Government Chief Information Officer (OGCIO), and the Office of the Privacy Commissioner for Personal Data (PCPD) found the system satisfactory.

面試透過網上系統進行,並有專責人員全程監控及提供即時技術支援
The interview is conducted via the online system, with responsible officers monitoring throughout the process and providing technical support whenever necessary

申請人
Applicant

保安妥善的機電署網絡
Secured EMSD Network

機電署面試員
EMSD Host

申請人的個人資料及面試題目經由機電署內部伺服器處理及直接傳送,以減低資料外洩的風險
Applicants' personal data and the interview questions are processed and directly transmitted through the EMSD's internal servers, thereby mitigating the risk of data leakage

區域數碼監控中心為樓宇的機電數碼設備提供全天候監控
Regional Digital Control Centre Provides Round-the-clock Monitoring of E&M Digital Facilities in Buildings

衛生署署長陳漢儀醫生及其團隊於 2020 年 5 月 27 日到訪機電署總部,參觀位於機電署總部大樓的區域數碼監控中心。我們的團隊講解了區域數碼監控中心在實現機電數碼化所擔當的重要角色,以及示範如何利用大數據分析及人工智能處理每日從個別建築物傳來的 60 多萬則數據,從而為機電數碼設備提供全天候監控,在發生突發事件時亦能提供適時協助。

Dr. Constance Chan Hon-yee, Director of Health, together with her team from the Department of Health (DH) paid a visit to the EMSD Headquarters on 27 May 2020, during which our team explained the role of the Regional Digital Control Centre (RDCC) in achieving E&M digitization, and demonstrated how we handled over 600 000 pieces of data from a singular building daily with the application of Big Data Analytics and Artificial Intelligence (AI), thereby achieving round-the-clock monitoring of their E&M facilities and enabling our team in responding to any emergency issues promptly whenever necessary.

衛生署署長陳漢儀醫生(中)和機電工程署署長彭耀雄先生(左)參觀區域數碼監控中心。
Director of Health, Dr. Constance Chan Hon-yee (middle), and Director of Electrical and Mechanical Services, Mr. Pang Yiu-hung (left), pay a visit to the Regional Digital Control Centre.

培育卓越團隊
Excellent Work Team

事例 CASE 4

急市民所急 迅速為檢疫中心裝設機電設備 加強團隊協作
Set up E&M Equipment Promptly at Quarantine Centres to Address the Pressing Needs of the Public and Strengthen Team Collaboration

機電署於農曆新年前夕接獲衛生署的要求，須在短時間內作好準備，為火炭駿洋邨的大量檢疫單位提供支援。全賴我們的五年策略計劃，機電署可及早作好人手部署。在時間緊迫的情況下，我們組織了一支跨部別團隊，動員約 70 位同事為邨內 3 000 多個單位裝設機電設備，包括約 3 200 部煤氣熱水爐及超過 16 000 組照明裝置，方便接受檢疫人士入住有關單位。

在食物及衛生局的帶領和衛生署的支援下，加上房屋署、業界承辦商、民眾安全服務隊，以及政府物流服務署等方面充分協調和無間斷地提供協助，我們才能於短短兩個月內滿足檢疫中心的需要。

民眾安全服務隊、建築署、機電署及衛生署的代表視察檢疫單位
Representatives from the CAS, the ArchSD, the EMSD and the DH conduct inspection to a quarantine unit

檢疫隔離中心內的機電設備
E&M equipment at a quarantine centre

On Lunar New Year's Eve, the EMSD was requested by the Department of Health (DH) to provide support in preparing a large number of quarantine units at Chun Yeung Estate, Fo Tan. Thanks to the fruit of our Five-year Strategic Plan in developing an excellent team, suitable manpower deployment arrangements could be made in a timely manner. Under extreme urgency, we formed a cross-divisional team comprising about 70 colleagues to undertake the installation of E&M equipment, including about 3 200 town gas water heaters and over 16 000 lighting units, at over 3 000 units for people under quarantine.

Led by the Food and Environmental Hygiene Department (FEHD) and supported by the DH, and coupled with coordination and assistance rendered by the Housing Department (HD), trade contractors, the Civil Aid Service (CAS) and the Government Logistics Department (GLD), we were able to address the needs of quarantine centres within the short span of two months.

事例 CASE 5

為 141 個社區檢測中心進行機電設備緊急檢查 考驗團隊應急支援能力
Conduct Urgent Assessment of E&M Equipment at 141 Community Testing Centres With a View to Examining the Support Capabilities of Emergency Team

機電署的卓越團隊亦為政府在各區設立的普及社區檢測計劃的社區檢測中心提供專業意見以切斷社區的病毒傳播鏈。我們檢視社區會堂、體育館、學校等場地的通風情況能否配合衛生署建議的感染控制措施，以確定這些場地是否適合作為社區檢測中心。

機電署在三天內檢視逾 200 個場地的通風系統，協助政府盡快推行普及社區檢測計劃。我們亦調派工程師在政府總部的指揮中心當值，全天候支援、監察及協調全港各區共 141 個檢測中心的機電設施，確保其運作正常。

機電署人員為社區檢測中心檢視機電設備
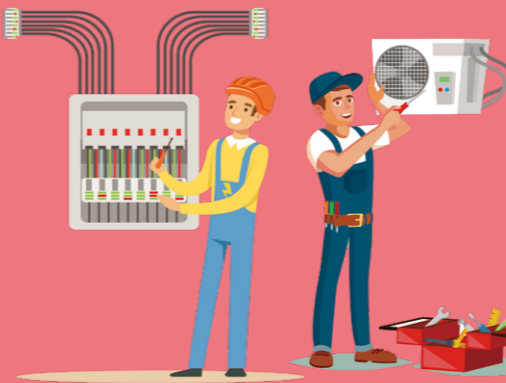**EMSD Staff assessing E&M equipments for UCTP Venues**

Another example of our excellent work team has contributed in fighting against COVID-19 was providing professional advice on the community testing centres of the Universal Community Testing Programme (UCTP) for the Government in order to cut the virus transmission chain in the community. We checked to see if the ventilation systems in various community halls, sports centres and schools align with the DH's recommended infection control measures and if those venues were suitable to be used as community testing centres.

The EMSD conducted assessment for the ventilation system of over 200 venues in three days so that the Government could launch the UCTP as soon as possible. We also deployed Engineers to the Command Centre at the Central Government Offices to provide support, monitoring and coordination for E&M equipment of the 141 community testing centres round-the-clock in order to ensure their normal operation.

政務司司長張建宗（左一）、公務員事務局局長聶德權（左二）及一般職系處長陳信瑜先生（左三）視察政府總部的指揮中心並會晤本署工程師了解運作流程
Chief Secretary, Mr. Matthew Cheung (1st left), Secretary for the Civil Service, Mr. Patrick Nip (2nd left) and the Director of General Grades, Mr. Hermes Chan (3rd left), visit the Command Centre for UCT at the QGO and meet with our engineers to gain a better understanding of the workflow

建立專門技術及數碼化團隊
Establish Work Teams with Specialised Technology and Digitisation Practices

事例 CASE 6

與建造業議會合辦「建築信息模擬資產管理」培訓課程 加強核心業務能力
Offer Building Information Modelling - Asset Management (BIM-AM) Training Course in Conjunction with Construction Industry Council with a View to Enhancing Core Business Capability

機電署將與建造業議會合辦有關建築信息模擬資產管理的證書課程。課程內容已有定案，預計每年可為業界及機電署同事提供 240 個學額。課程旨在提升參加者對建築信息模擬資產管理的認識，並確保政府建築物緊貼建造業的數碼科技新趨勢。

The EMSD will offer a certificate course on Building Information Modelling - Asset Management (BIM-AM) in conjunction with the Construction Industry Council. The course contents have been finalised. It is expected to provide 240 quotas each year for the trade and EMSD colleagues. The course is aimed at enhancing participants' knowledge on BIM-AM and ensuring that the latest digital technologies of the construction industry are adopted in government buildings.
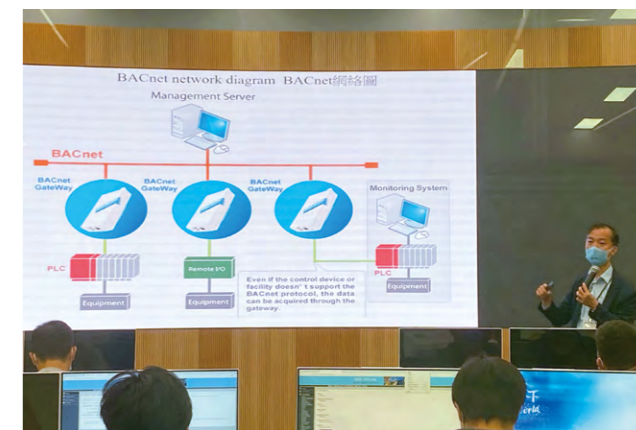
建築信息模擬資產管理課程的指引
Guidelines for the BIM-AM course

事例 CASE 7

為見習技術員提供綜合樓宇管理系統的培訓課程
Providing Trainings on intergraded Building Management Systems to Technician Trainees

因應機電數碼化的發展，機電署為即將畢業的所有見習技術員安排綜合樓宇管理系統（iBMS）的培訓課程，以建立專門技術及數碼化作業的團隊。首班 iBMS 的理論課已於 2020 年 10 月 28 日舉行，而實踐課程亦會陸續舉辦。為提升機電署團隊的專業水平，此 iBMS 的培訓將會在未來拓展到機電署的其他現職前線同事。

In view of the development of E&M digitisation, the EMSD provided trainings on integrated Building Management System (iBMS) to final year technician trainees to establish work teams with specialised technology and digitisation practices for different categories of major E&M assets. The first training regarding the theory of iBMS was conducted on 28 October 2020 and we will conduct practical trainings gradually. In order to raise the professional standard of the EMSD team, such iBMS trainings would be provided to other current frontline staff as well in the future.

綜合樓宇管理系統的培訓課程
Training courses on iBMS

事例 CASE 8
因應客戶需要 提供創新防疫解決方案
Providing Innovative Anti-Epidemic Solutions in Response to Clients' Needs

機電署為各政府部門提供適切的防疫方案，例如為公共設施及政府車輛噴塗已霧化的納米光觸媒消毒塗層，利用二氧化鈦粒子於光催化作用下分解病菌、甲醛等污染物。

針對第三波疫情，我們特別採用消毒機械人，為懲教署、消防處及食環署，於監獄、消防及救護學院和公眾街市進行消毒工作。機械人可全自動化移動，並以紫外線消毒燈、360 度消毒噴頭及0.3um 空氣過濾器，消滅在空氣中及物件表面上近 99.99% 的細菌及病毒，過程最快只需 10 分鐘。

為灣仔入境事務大樓的設施、升降機及升降機大堂噴塗已霧化的納米光觸媒消毒塗層
A disinfection coating of atomised photocatalytic nanoparticles is sprayed on the facilities, lifts and lift lobbies at the Immigration Tower in Wan Chai

The EMSD provided various government departments with suitable anti-epidemic solutions. For instance, a disinfection coating of atomised photocatalytic nanoparticles was sprayed on public facilities and government vehicles, using titanium dioxide particles to decompose germs and pollutants like formaldehyde by photocatalysis.

In the face of the third wave of the epidemic, we assisted the Correctional Services Department (CSD), the Fire Services Department (FSD) and the FEHD in carrying out disinfection work at prisons, Fire and Ambulance Services Academy and public markets with disinfecting robots. Fully automated in moving and capable of using its UV lights, 360-degree disinfecting spray and 0.3um air purifier, these robots can kill almost 99.99% of bacteria and viruses in the air and surfaces of objects in as short as 10 minutes.

配備紫外線消毒燈的消毒機械人在公眾街市操作的情況
A disinfecting robot equipped with UV lights operates in a public market.

加強政府車輛消毒工作
Enhance disinfection controls on government vehicles

事例 CASE 9
為懲教署組裝、測試和調校口罩生產機
Assembly, Testing and Commissioning of Mask Production Machines for the Correctional Services Department

疫情期間懲教署引入的五部口罩生產機，交由機電署協助組裝、測試和調校。當中涉及四個不同型號的口罩生產機，均屬懲教署未曾使用的款式，也缺乏原廠的本地技術支援。機電署的專責團隊盡力運用既有的工程知識，並向口罩生產機廠商尋求支援，透過參考錄像指引進行反覆調校及測試，最終成功兼顧高產能和可靠性，克服了技術障礙，確保在疫情嚴峻的時刻順利生產口罩，供各政府部門使用。

During the epidemic, the Correctional Services Department (CSD) introduced five mask production machines, with the assembly, testing and commissioning procedures carried out by the EMSD. The machines were of four different models that had not been used by the CSD before and local technical support by original manufacturers was unavailable. To overcome the technical obstacles, the dedicated team of the EMSD made the best use of relevant engineering knowledge, and sought support via video instructions from manufacturers. After conducting testing and commissioning repeatedly, the EMSD was eventually able to achieve high productivity and reliability, thus ensuring that mask production for various government departments was successful in the midst of a challenging epidemic.

懲教署近日投產的全自動口罩生產機
The CSD's fully automatic mask production machines have been recently put into operation

為懲教署裝設口罩生產機
Installation of mask production machines is carried out for the CSD

事例 CASE 10
「機電創科之旅：創科抗疫」展覽
"E&M InnoTour: Anti-epidemic I&T Applications" Exhibition

「機電創科日 2020」虛擬展覽主頁
Main Page of the E&M I&T Day 2020

在抗疫新常態下，機電署發揮了「創新促成者」的角色，緊貼客戶的不同需要，提供多元化的解決方案。2020 年 5 月 25 日至 27 日，機電署於總部大樓舉行「機電創科之旅：創科抗疫」展覽，與來自醫院管理局、衛生署、菲臘牙科醫院及政府化驗所的同事探討在疫情下，創科方案能如何協助醫療衞生科學範疇的客戶應對種種挑戰。

因應第三波疫情，我們以虛擬展覽形式舉行「機電創科日 2020」，除邀請了策略創科伙伴重點介紹空調裝置、電氣裝置、消防裝置、防盜及保安裝置等四個範疇的相關創科方案外，還舉辦了超過四十場網路研討會。兩項創科活動總共吸引逾 700 名來自不同政府部門、公營機構、創科和機電業界代表參與。

Under the new norm of battling against the epidemic, the EMSD has played the role of "innovation facilitator" by swiftly responding to the different needs of clients and providing them with diversified solutions. During the "E&M InnoTour: Anti-epidemic I&T Applications" Exhibition that took place at the EMSD Headquarters Building from 25 to 27 May 2020, the EMSD, together with colleagues from the Hospital Authority, the DH, the Prince Philip Dental Hospital and the Government Laboratory, explored how I&T solutions could address challenges faced by clients in the healthcare sector during the epidemic.

In the face of the third wave of epidemic, we launched the E&M I&T Day 2020 in the form of an virtual exhibition. Apart from inviting our strategic I&T partners to introduce innovation solutions covering four areas, viz. air-conditioning, electrical, fire services as well as anti-theft and security installations, we also held over 40 webminars. The two I&T events attracted over 700 representatives from different government departments, public organisations, and representatives from I&T partners and E&M trades.

客戶於「機電創科之旅：創科抗疫」展覽參觀機電創科專區
Clients visit the E&M InnoZone during the "E&M InnoTour: Anti-epidemic I&T Applications" Exhibition

如您對機電工程營運基金第二個五年策略計劃有任何建議，
歡迎以電郵方式向我們提出：
We welcome your suggestions on the second five-year strategic plan for the EMSTF.
And for enquiries, please email us at

2nd5yearplan@emsd.gov.hk

如欲瀏覽機電工程署創新科技協作平台，請到以下網址：
For the E&M InnoPortal, please visit:

https://www.emsd.gov.hk/inno

如欲瀏覽機電工程署主網頁，請到以下網址：
To view the main website of the EMSD, please go to the following website:

https://www.emsd.gov.hk

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機電2.0
服務新里程
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第二個五年策略計劃

機電工程署
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