The HKIE CAD 30th Anniversary Symposium

Keynote Speech by Ir Alfred Sit JP, Director of Electrical & Mechanical Services

"Engineering a New Horizon from 70 years Foundation – The Automation Era"

Good morning, Ir Cheung (Morris, CAD Chairman), Ir Lock (Eddie, Symposium OC Chairman), [The Honourable Ir Dr Lo (Wai-kwok, keynote speech speaker)], distinguished guests, ladies and gentlemen. It is my great honour to speak in this momentous occasion of the 30th anniversary of the HKIE CAI Division. May I wish the division a happy anniversary and continuous success in many decades to come.

Dreams come true

In a few days' time, it will be a special day, 年廿八, which is for us to clean up our home for the Chinese New Year. It reminds me one of my childhood dreams. When I was a kid, I was often assigned with the daily floor-sweeping duty at home. I have always been dreaming to have a magic sweeper to automatically do the job for me. Today, automated cleaning is no longer a dream with those household robotic vacuum cleaner, which quietly and automatically runs around at your home and smartly returns back to its charging station after the cleaning duty is done. My son has now inherited my 年廿八 cleaning duty. I am guessing that it may be one of his dreams that one day a cleaner robot simulating human cleaning movement, is easily affordable in every household to clean the kitchen and toilet for us.

HKIE 70 years of Foundation

The theme of the seminar today is about Engineering a New Horizon from 70 Years Foundation. 2018 has a special meaning for the Hong Kong Institution of Engineers and the Electrical and Mechanical Services Department. Both HKIE and my department, EMSD, are celebrating their 70th anniversary this year. The ways how people work and enjoy and how the industry manufactures and distributes products have been drastically changed in the recent decades. Over the past 70 years, our fellow engineers must have done something very remarkable to achieve all these while improving our standard of living. May I take one interesting CAI development as an example?

Make a difference

Exactly 70 years ago, two university graduates patented the barcode system which they developed for a local food chain store to automatically read product information during the checkout process. However, the barcode system hasn't been changed for nearly half century and its application was limited to item tracking due to its limited storage capacity. It was not until 1994 when a car manufacturing subsidiary of Toyota who made a small difference to the barcode system that revolutionized its application. The company transformed the linear barcode into a two-dimensional QR Code, for tracking vehicles and parts in the manufacturing process. The evolution from the original one-dimensional barcode format having 10 trillions combinations into the two-dimensional QR code of nearly limitless capacity has unleashed infinite potential for a variety of applications waiting for us to explore. Let me share an interesting figure with all of you. Today, there are over 1.3 billions WeChat pay and Alipay accounts enjoying the convenience of QR code payment.

Four years ago, EMSD has also made a small difference in the application of the Building Information Modelling system, or BIM in short, to suit our operational needs. By integrating BIM with asset management features, we developed a BIM-AM system and obtained a patent of it in 2017. To put BIM-AM into practice, we have also started six pilot projects on government E&M engineering assets, including those in EMSD Headquarters, to apply Augmented Reality (AR) and Virtual Reality (VR) technologies in building engineering asset management, operation and maintenance.

Inspire CAI engineers

No doubt, we, engineers have built a strong foundation in the past 70 years to improve our quality of lives. However, it is you, and many CAI practitioners all over the world, who have been reinventing our mobile phones, who are going to remove the human from the driver seats totally, and who have been quietly and swiftly digitizing our world. I do believe this is just the beginning of the CAI golden era which will continue to prosper in the future.

Realizing the Smart City Blueprint

To contribute in developing Hong Kong into a world class smart city, EMSD are seizing every opportunity to digitize the government E&M engineering assets for improving our operation and maintenance services.

Two years ago, leveraging on wireless technology, we have digitized the monitoring of all traffic lights, submersible pumping systems at pedestrian subways and vehicle underpasses, footbridge lifts and escalators throughout Hong Kong. Our fellow colleagues in EMSD can now easily access the operating status, in particular fault alerts, via mobile phone anywhere, anytime.

EMSD is also collaborating with the Energizing Kowloon East Office, OGCIO, HK Observatory, Environmental Protection Department, Transport Department and Highways Department to launch a series of smart city pilot trials including Multi-functional Smart Lampposts, Dedicated Network for Internet-of-Things for E&M Engineering Assets, and Building Energy End-use Analytics. To give you an idea, the Multi-functional Smart Lampposts integrate IoT sensors, 5G wireless network and CCTV systems to collect environmental and transportation data to facilitate monitoring and data analytics as well as release of the data for public use.

However, despite the efforts that I have just mentioned and the common perception that Hong Kong is a very efficient city in many aspects, in a report compiled by EasyPark in November 2017 comparing the implementation of smart city initiatives in the world, Hong Kong only ranked 68th among 500 modern cities while Singapore came in second. In Asia, we were also behind many of our neighboring cities including Tokyo, Seoul, Osaka and Taipei.

In December 2017, the government's Smart City Blueprint came out timely and provided a good foundation for us to catch up in smart city development. The Blueprint charted out six major areas including Mobility, Living, Environment, People, Government and Economy, targeting smart city initiatives such as intelligent transport systems, electronic identity, open data and fintech.

Taking smart mobility as an example, as you all know, we can now use our Octopus and credit cards to pay tunnel tolls. In two years' time, the new generation of electronic parking meters will accept remote online payment, credit card payment and mobile phone QR-code payment. However, we will not stop working on it, and we will have bigger dreams. I can imagine that in the future, with embedded occupancy sensors and digitized vehicle license permits, we will no longer need parking meters. Collection of parking fee, online display of parking space availability and illegal parking enforcement will all be automated via the

meterless parking technology. To make our dreams come true, we really need the support from our fellow CAI engineers.

Imagination is without limit. I am sure there are many other areas where CAI engineering can help in building a smarter Hong Kong. Being one of the practitioners in this field, I also appeal for your imagination and proactive participation in realizing this important government blueprint on smart city.

EMSD as a facilitator

Apart from the Smart City Blueprint, the Policy Address announced by the Chief Executive last year also promulgated a new governance philosophy. Other than being a "Service Provider" and "Regulator", the government should take up the role of "Facilitator" and "Promotor", and follow the principles of being "Innovative, Interactive and Collaborative" to resolve problems for the community. Based on this philosophy, EMSD announced the establishment of an "Innovation and Technology Collaboration Platform" last November. We have opened up our Headquarters Building at Kowloon Bay as a testing ground for local start-ups and research institutes to implement their innovative ideas as well as verification of their effectiveness. The platform enables mapping between "wish list" of government Bureaux and Departments and innovative ideas of the start-ups and research institutes while sharing the successful cases.

The collaboration was indeed started in 2014. We have so far supported 11 innovation projects on E&M engineering facilities of various government departments. Five of them were successfully granted with government Innovation and Technology Funds of over HK$10 millions. Another 12 innovation projects including driving behavior monitoring, battery condition monitoring, energy efficient fan coil, and solar wind turbine are also in the pipeline.

Innovation does not need to be a new invention. Instead, novel application of technology to solve the existing problems is also a kind of innovation. Therefore, if you have innovative ideas or products on resolving E&M challenges, you are welcome to approach us to identify a suitable testing ground for you. If you are facing challenges and looking for innovative solutions, do not hesitate to check on our platform, which will be launched later this month,

to see if there are readily available solutions. If your organization wishes to open up your facilities as testing grounds, we are also very pleased to include you into our platform.

EMSD Inno-Office

To embrace the opportunities arising from innovation and digitization, EMSD is setting up an Inno-Office at corporate level to connect with local universities and start-ups, and to drive innovation and application of cutting-edge technology. This Inno-Office also provides back-end technical support for dedicated Inno-Teams in different business units to develop innovative proposals that suit the operational needs of different government departments. We will also set up Inno-Sandbox to collect innovative proposals and concepts from staff. For those selected proposals, we will provide all-round support including the necessary funding, testing ground and allowing the Inno-Sandbox members to devote their full-time effort to test and implement their pilot projects.

Concluding remarks

To conclude, I would like to share with you one of my favorite quotes. A great imaginer, Mr Walt Disney once said "If you can dream it, you can do it". 70 years ago, we used the sweeper to clean our floor and now automated cleaning is no longer a dream. 70 years ago, EMSD was established as a government E&M service provider, and now we are taking up the role of facilitator by providing an "Innovation and Technology Collaboration Platform" to facilitate the trade to explore the applications of innovative technologies. With the foundation built over the past 70 years, you, the CAI practitioners, are engineering a new horizon in the golden era of CAI. To end my speech, I would like to slightly modify Mr Walt Disney's quote. "If we can dream it, we can do it together". Ladies and gentlemen, I am looking forward to working with you all, CAI engineers, to make Hong Kong a smarter and more innovative city. Thank you.

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