Hong Kong R&D Centre for Logistics and
Supply Chain Management Enabling Technologies
香港物流及供應鏈管理應用技術研發中心

[Immediate Release]

LSCM R&D Centre and CUHK co-developed cost-effective and user-friendly real-time environmental monitoring system for 24-hour monitoring temperature, humidity & illumination Debuts in "Western Scientific Instruments of the Qing Court" at HK Science Museum

(Hong Kong, 6th August, 2015) The Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies (LSCM R&D Centre) collaborates with the Faculty of Engineering of The Chinese University of Hong Kong (CUHK) and has successfully developed a **"Real-time Environmental Monitoring and Sensing System"**, which offers diversified applications. It has made its debut in the Hong Kong Jockey Club Series: "Western Scientific Instruments of the Qing Court" exhibition which is now currently held at the Hong Kong Science Museum. Around 120 exhibits of century-old western science apparatus from the Palace Museum, including the armillary sphere made by Ferdinand Verbiest, the iron gun used by Emperor Kangxi, and the painting of"All nations coming to the court to present tribute" which was commissioned by Emperor Qianlong, are being meticulously monitored and well-preserved by the advanced monitoring system.

Through the combined efforts of the museum and the research and development team, these well-preserved cultural treasures lead us to explore the scientific world more than 300 years ago. The wireless sensors are compact and small in size. They can monitor temperature, humidity, illumination, ultraviolet (UV) radiation, vibration in real-time for 24 hours. The cost of the new system has been largely reduced to 10% of the existing ones imported from overseas.

Old system uses paid bandwidth and suffers maintenance inconvenience

The old monitoring system imported from overseas by the Hong Kong Science Museum more than 10 years ago is more complicated in terms of installation. The sensors are larger in size which can monitor temperature and humidity only. When problems arise and need to change parts or require other maintenance, the museum has to contact the overseas headquarter through the agent which costs time and money. On the other hand, the old system uses the paid bandwidth which easily jams with other signals and increases the operation cost.

Cost control and user experience consideration

This brand new monitoring system is developed jointly by the LSCM R&D Centre and the team led by Prof Ke-li Wu, from the Faculty of Engineering of CUHK. After several on-site pilot tests in

Hong Kong Museum of History and Hong Kong Film Archive under Leisure and Cultural Services Department (LCSD), the system have come up with a set of satisfactory testing results.

Besides being larger in size, the old sensors are inseparable from the main modules, hence more complicated to install. The museum staff have to open the showcase when they change the battery. In contrast, the newly developed sensor not only monitors temperature and humidity, it also monitors and records the useful data of ultra-violet light, illumination and vibration.

New system utilises ISM band and enjoys stable signal transmission

New module uses regular batteries, which are easy to replace. The most innovative element of the system is the universal sensor contact point, which allows each wireless network node connecting several different sensors at random. Since the sensor and the wireless network node are separable, museum staff can conveniently change the batteries of the monitoring module. The probe sensor is small enough to be placed besides the exhibits and still not obstructing the visitors'view. This monitoring set also provides offline mode to collect data during transportation. The data collected by the device are transmitted to the control centre through the router placed in different corners of the museum. The transmitting process is more stable than before and not easily obstructed. It saves money since the signals utilise the ISM band.

Durable, refined, flexible and multi-functional

Prof Ke-li Wu, who is responsible for the main module and hardware system research said, "Most of the research are done by young staff from the CUHK, including researcher Mr Da-cheng Wei and assistant researcher Mr Nicky Lam, Mr Wing-hung and Mr Tim Chan. They have modified the design of the sensor and every part in the network system to match the requirements of the museum in terms of accuracy, outlook and user experience."

Prof CH Cheng who takes charge for the software research said, "We won't confine our vision for helping local museums only, but also keep an eye on the international museum scene. We appreciate the support from the LSCM R&D Centre as well as the Innovation and Technology Fund to this project, the fruitful results of which will play an important role for the projects yet to come."

Mr Simon Wong, Chief Executive Officer of the LSCM R&D Centre stated "We are pleased that our locally developed technology can be on a par with overseas products and even meet the strict requirements properly. The collaboration can be regarded as the symbol of successful

combination of local creative technology and historic science instruments. Besides, the application of the monitoring system is very wide, such as in cold chain logistics and commercial warehouse management. Since eCommerce would be a significant retailing model in the future, monitoring every product's conditions inside the warehouse will become the key of logistics and supply chain management. We hope that this technology can turn to mass production and enhance the development of local trade and commerce."

Comparison

	"Real-time Environmental Monitoring and Sensing System" developed by LSCM R&D Centre and CUHK	Existing foreign developed system
Network	Free bandwidth (uses ISM band), Zigbee Alliance, Deployment flexibility	Paid bandwidth, Non-standard Communications Agreement
Monitoring categories	Besides temperature and humidity, it can monitor ultra-violent light, illumination and vibration, the sensor coverage can be extended.	Temperature and humidity only
Size	Small and easily hidden	Bulky
Sensor	• Detached from the main module • Each module can support 5 different sensors and no restriction on combination, such as two illumination sensors, two humidity sensors and one humidity sensor attached to the same module • Placed in the showcase independently. Connected with the main module through the wire. Battery can be changed without opening the showcase	• Build-in sensor • Each module can support two sensors only to monitor temperature and humidity • Cannot be placed inside the showcase independently

About LSCM R&D Centre

The Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies (LSCM R&D Centre) was founded in 2006, with funding from the Innovation and Technology Fund of the HKSAR Government, and co-hosted by The University of Hong Kong, the Chinese University of Hong Kong and the Hong Kong University of Science and Technology. It aims to

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strengthen the local logistics industry by providing a one-stop shop for enabling technology research, technology transfer and commercialisation, and reinforce the cooperation between the industry and research institutes, to bring about meaningful and significant benefits to the community.

Media Enquiry

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Appendix 1: Sensor placed besides the exhibits

Appendix 2: Monitoring figures