

**For Discussion
on 2 April 2019**

Legislative Council Panel on Security

**The Development of “Smart Prison”
by the Correctional Services Department**

PURPOSE

This paper briefs Members on the plan of the Correctional Services Department (CSD) on the development of “Smart Prison”.

BACKGROUND

2. In her 2018 Policy Address, the Chief Executive put forward the application of innovation and technology to enhance the capabilities of law enforcement agencies, including the development of “Smart Prison”. CSD has all along been committed to providing a secure, safe, humane, decent and healthy custodial environment for persons in custody (PICs). Since most of the correctional facilities in Hong Kong have been in use for many years or converted from buildings originally built for other purposes, CSD must keep on improving or redeveloping existing facilities, including expanding the application of technology, to cater for the custodial and rehabilitation needs of PICs.

3. To cope with the development of correctional services, CSD conducted the first “Information Systems Strategy Study” in 2013. The study recommended the development of an “Integrated Custodial and Rehabilitation Management System”¹ (iCRMS). CSD sought the Legislative Council’s funding approval and was granted over \$350 million in 2016 to develop the iCRMS and to enhance the capacity of the existing information technology infrastructure, so as to improve operational efficiency in the long run and to provide a good foundation for CSD’s use of innovation and technology in the future. The relevant project includes establishing a core network, and enhancing network safety and flexibility of network connection. This project will facilitate

¹ The iCRMS will replace the existing eight core information technology systems to enhance custodial and operational efficiency, to reinforce the integration of security intelligence, to tailor more suitable rehabilitation programmes for PICs to facilitate their re-integration into society, and to provide additional electronic services for relatives and friends visiting PICs (such as e-booking service for visits).

the further setting up of an Internet of Things required for “Smart Prison”. In addition, the iCRMS will establish a single platform for centralised data and business application to increase the operational and recovery capacity of the system, with greater flexibility and expansion capability for developing “Smart Prison”, and to lay a foundation for data analysis and development of CSD. At present, the iCRMS is at the stage of software design and system upgrade. The whole project is expected to come into operation in 2023.

4. Moreover, to cope with the rapid, ever changing and complicated social circumstances as well as new challenges of correctional work, CSD formulated a “Strategic Plan” for its future development in 2018. One of the objectives of the “Strategic Plan” is to build an integrated and sustainable correctional system by combining operational and information technology systems (including the integration of facilities, systems and data) to collect and analyse data, and to apply the results of analyses to strategic planning and penal management, with a view to achieving better outcomes for all policies and allowing for the sustainable development of the correctional system. To this end, CSD proactively develops “Smart Prison” through the implementation of innovation and technology strategies to modernise, informatise and humanise the management mode and process innovation of correctional facilities. To facilitate the planning of the long-term development of “Smart Prison”, CSD set up an inter-departmental Steering Committee on Smart Prison (Steering Committee) chaired by the Deputy Commissioner of Correctional Services in the same year. Its members include representatives from the Electrical and Mechanical Services Department (EMSD), the Architectural Services Department and the Office of the Government Chief Information Officer. The Steering Committee is tasked with the introduction of smart elements into major facility improvement projects in future so as to modernise the operations of correctional facilities, with a view to enhancing the efficiency and security of prison management.

The “Smart Prison” Concept

5. The “Smart Prison” concept comprises the following four key elements –

(a) “Development of Smart Governance”

By integrating operational and information technology systems and applying innovative information and communication

technologies, data from various areas can be collected, analysed and applied, with a view to enhancing the efficiency of institutional management and operations, strengthening correctional officers' readiness in emergency response, and facilitating the Department's long-term strategic planning.

(b) “Implementation of Process Innovation”

By applying innovative technology and reviewing the relevant workflow to tie in with the latest development in correctional work, CSD seeks to achieve the goals of optimising use of resources, enhancing the effectiveness of rehabilitation programmes, improving the efficiency of institutional management and operations, as well as implementing sustainable development. At the same time, the Department encourages correctional officers to examine current work patterns and conduct research, with a view to improving procedures of correctional work. For example, during the designing stage of the iCRMS, the Department appointed correctional officers with different types of responsibilities to participate in project design, and also took the opportunity to look into the existing work patterns.

(c) “Cultivating Knowledge-based Correctional Officers and Enhancing the Capacities of Rehabilitated Persons to Re-integrate into the Society”

CSD aims at intensifying the training of correctional officers in the application of innovative technologies and systems, so as to facilitate correctional management and to provide PICs with appropriate help and support. Moreover, the Department also plans to introduce applied technology systems which enable PICs to manage their daily matters, including the introduction of a “PICs Self-service Kiosk” which enables PICs to purchase canteen items and make requests etc., thereby enhancing the scope for the management of daily matters, with a view to providing them with more favourable conditions conducive to their re-integration into society.

(d) “Application of Smart Prison Designs”

Concepts such as technology application, environmental conservation and people-orientated approach will be

incorporated into designs of correctional institutions. For example, the Department is exploring the addition of the “Geographic Information System” (GIS) and the “Building Information Modelling” (BIM)² to correctional facilities to be built or redeveloped in the future, which will provide correctional officers with prompt and accurate information on the real-time status of the institution. Meanwhile, through facilities and process optimisation, the Department also seeks to facilitate correctional officers’ management and support of the development of rehabilitation programmes, with a view to devising modern correctional institution designs that connect people, technology and the environment.

Application of Innovative Technology

6. To prepare for the development of “Smart Prison”, CSD has been conducting studies on the introduction of innovative technologies and review of workflow to strengthen its capabilities in data application and to enhance the efficiency of institutional management since 2018. In this regard, CSD arranged officers to visit correctional institutions of other regions and exchanged experience on the application of technologies. CSD, in collaboration with EMSD, also studied the feasibility of introducing various innovative technologies in correctional facilities. After consolidating the views of various parties and having regard to operational needs of institutions and the feasibility, CSD plans to conduct three trials in specific areas of individual institutions – i.e. “Health Signs Monitoring System”, “Video Analytic Monitoring System” and “Passage Surveillance System” – to align with the re-engineering of management and operational workflow of institutions, with a view to enhancing the overall effectiveness of institutional management. The application of these systems are detailed below.

² The “Geographic Information System” (GIS) (also known as “Institutional Electronic Map”) integrates data collected from various technological systems and facilities, and displays and records different types of information or consolidated data on the electronic map in real time for the user’s retrieval and application. It also automatically records information on PICs’ distribution, location and movement etc. Apart from effectively preventing human errors, this also reduces the use of paper for better protection of the environment.

The “Building Information Modelling” (BIM) enables the viewing of a building’s three-dimensional model (including interior and exterior) in the system, and users may inspect the building’s internal setting, layout of works of building services systems (including ventilation, firefighting, water supply and electricity systems) and their real-time status. Should building services systems experience irregularity, users are immediately notified for follow-up action. If riots break out in correctional institutions, the Department may conduct strategic planning with the help of the System, which enables access to information of the operational status of different building services systems, and contain the situation at the scene through controlling these systems (such as cutting off water and electricity supply).

“Health Signs Monitoring System”

7. At present, after PICs return to their cells at around 8pm to rest at night, correctional officers are required to carry out patrols and conduct visual checks on the physical conditions of PICs with medical or nursing needs at intervals of not more than 15 minutes. Although the existing mechanism has ensured that PICs are closely monitored upon returning to their cells, we could not preclude the possibility that the physical condition of some PICs may suddenly become abnormal after each patrol. Therefore, CSD plans to ensure that the physical conditions of PICs are monitored scientifically round the clock through the application of innovative technologies, so as to protect the safety of PICs.

8. In this connection, the Department plans to introduce in centre hospitals the “Health Signs Monitoring System”, which can monitor heart rates, for monitoring the physical condition of PICs with medical and nursing needs, including those who have self-harm and suicide propensity. After consulting the Medical Officer of the institution, the Department will arrange those PICs to wear “smart wristbands” to monitor their heart rates. If any abnormalities of heart rates are detected, the System will instantly raise an alarm to alert the correctional officers on duty for immediate follow-up action.

9. The abovementioned “Health Signs Monitoring System” is one of the technological applications under the “Development of Smart Governance”. The System helps detect the physical conditions of PICs in a scientific manner. It not only complements the existing practice of visual checks, but also enables correctional officers to detect any physical abnormalities of PICs as early as possible for immediate follow-up action, thereby enhancing healthcare standards and reducing the risk of self-harm. This helps protect the safety of PICs and raise the professional standard of correctional officers in law enforcement and supervision.

“Video Analytic Monitoring System”

10. Correctional officers are currently required to carry out patrols and conduct visual checks on PICs at intervals of not more than 15 or 20 minutes³ after PICs return to their cells, to ensure the discipline and safety of PICs. Although the existing mechanism has ensured that PICs

³ Correctional officers are required to carry out patrols to inspect PICs on the Medical Observation List and Escapee List at intervals not exceeding 15 minutes. As for other PICs, correctional officers are required to carry out patrols at intervals not exceeding 20 minutes.

are closely monitored upon returning to their cells, some PICs may still commit acts of indiscipline or inflict self-harm during the intervals between patrols.

11. In this regard, CSD plans to introduce the “Video Analytic Monitoring System” in the dormitories which can help monitor abnormal behaviours and acts of indiscipline of PICs. The System will compare the preset behaviour patterns with the real-time images collected by CCTV to detect particular types of abnormal behaviours, including suicide by hanging, self-harm by banging against the wall or fighting. If any preset pattern of abnormal behavior is detected, the System will instantly raise an alarm to alert the correctional officers for immediate follow-up action, to ensure that PICs are constantly under close supervision between patrols.

12. The introduction of the “Video Analytic Monitoring System” is one of the technological applications under the “Development of Smart Governance”. The application of the System will enhance CSD’s supervision of PICs on the one hand, and strengthen correctional officers’ readiness in emergency response on the other, thereby helping to ensure the security and safety of the custodial environment.

“Passage Surveillance System”

13. At present, correctional officers are required to manually count the number of PICs inside correctional institutions on a regular basis to ensure no missing or escape occurs. Besides, PICs must be escorted by correctional officers for their movement (i.e. moving from one place to another) inside institutions and every movement is recorded for tracing their locations. Although the movement of PICs is monitored under the existing mechanism, in the event of a major incident, correctional officers are still required to conduct manual counting and check the records at once so as to confirm the number and locations of PIC. This prevents correctional officers from immediately taking corresponding action. Therefore, the Department plans to strengthen the monitoring of PICs’ movement and to have access to information on the locations of PICs inside institutions at all times through the application of technology, with a view to enhancing the security of institutions and officers’ readiness in emergency response.

14. CSD plans to install in designated passages the “Passage Surveillance System” with the capacity to trace the real-time locations of PICs. With sensors installed in institutions and the signals from the

smart wristbands worn by PICs, the System can determine the real-time locations of PICs. If a PIC deviates from the originally prescribed route of movement, the System will instantly raise an alarm to alert the correctional officers for follow-up action as soon as possible. This helps enhance the daily operational efficiency of institutions and strengthen the monitoring of PICs.

15. The introduction of the “Passage Surveillance System” is one of the technological applications under the “Development of Smart Governance” and “Implementation of Process Innovation”. The System allows correctional officers to have access to information on the real-time locations of PICs and monitor their movement, with a view to minimising the risk of escape and enhancing correctional officers’ readiness in emergency response. Upon implementing the System, correctional officers originally responsible for escort duties will be arranged to operate the System and provide support in case of emergency. The Department will also conduct a review, taking into account the operation and facilities of institutions, to improve the existing practice of escorting PICs for their movement inside institutions. If manpower can be saved after restructuring the work process, the Department will deploy officers concerned to help alleviate the tremendous workload of existing officers in implementing the rehabilitation and counseling programmes, so as to raise the standards of correctional services in the overall.

IMPLEMENTATION PLAN

16. For the above three projects, CSD is now installing the systems for trial at the following locations –

- (a) “Health Signs Monitoring System”: centre hospital of Lo Wu Correctional Institution;
- (b) “Video Analytic Monitoring System”: 4 dormitories of Pik Uk Prison; and
- (c) “Passage Surveillance System”: a designated passage of Lo Wu Correctional Institution.

17. CSD will evaluate the efficacy of the systems within this year. Subject to feasibility and resources availability, CSD will further extend the above systems to other locations within the institution concerned as well as other institutions in a proactive and timely manner. Apart from the three trial projects, funding has been reserved under the TechConnect (which is a “Block Vote”) of the Innovation and Technology Bureau to extend the “Health Signs Monitoring System” and “Video Analytic

Monitoring System” to the following locations –

- (a) “Health Signs Monitoring System”: 2 halls and centre hospital of Stanley Prison, centre hospital of Tai Lam Centre for Women, and sickbay and geriatric ward of Siu Lam Psychiatric Centre; and
- (b) “Video Analytic Monitoring System”: 22 dormitories, 6 cells and centre hospital of Pik Uk Prison.

18. Preliminary planning on the two project items mentioned in paragraph 17 has commenced, and the overall works are expected to be completed in 2021. Apart from the above items, CSD will introduce the “Drug-detection Robotic Arm System” to replace by machine the search conducted manually on stool excreted by newly admitted PICs who are suspected of having concealed drugs inside the body. The robotic arm of the System will automatically detect the position of the stool and dissolve it by washing to facilitate examination by correctional officers. The System is expected to be piloted at Lai Chi Kok Reception Centre in the second quarter of this year. In addition, CSD is actively exploring with EMSD to introduce the GIS (see paragraph 5(d) and footnote 2), and also integrate with the “Passage Surveillance System”, so as to enhance the monitoring of real-time location and movement of PICs.

The Way Forward

19. CSD’s inter-departmental Steering Committee will formulate the direction of policy development and blueprint for “Smart Prison”; steer and monitor the implementation of the policies; and encourage stakeholders to explore and study ways to incorporate smart elements into prisons. In addition, the Department will launch the second “Information Systems Strategy Study” this year to evaluate the progress of projects proposed in the first Study and to devise a technological development blueprint for “Smart Prison” to roll out innovation and technology projects in the short, medium and long term according to priorities.

20. All four key elements of “Smart Prison” involve the application of technological knowledge and innovative systems. To enhance the quality of correctional service, CSD will continue to work with other government departments to explore the feasibility of introducing various technological projects into correctional facilities, to exchange experience and work patterns with the correctional authorities of other regions, and

to provide correctional officers with training on the application of technological knowledge and innovative systems.

21. In the long run, CSD hopes to apply the “Smart Prison” concept to both the hardware and the software of correctional institutions. The objective is to combine operational systems and information technology systems to collect data on various aspects for analysis and application, with a view to enhancing the efficiency of institutional management and operations, strengthening officers’ readiness in emergency response, and facilitating the Department’s long-term strategic planning in a more systematic manner.

Advice Sought

22. Members are invited to note and comment on the above development plan.

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Correctional Services Department
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