**For discussion
on 4 April 2023**

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Legislative Council Panel on Security

Information technology projects to enhance policing capability

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Purpose

      This paper briefs Members on the concept and latest development of Digital Policing in the Hong Kong Police Force (HKPF) and the major information technology (IT) projects proposed for implementation in the coming years.

Digital Policing

2.   The emerging and continuous development of innovation and technology (I&T), such as mobile technology, big data, 5th generation mobile communications (5G) technology, and Internet of Things (IoT) have not only triggered a fundamental shift in the ways the society, businesses and the Government operate, but also the way crimes are organized and committed. The serious violence in 2019 revealed the extensive use of I&T by criminals to disseminate fake news, incite the public and co-ordinate attacks, as well as organise various crimes etc. The pandemic over the past few years has also greatly changed people's ways of life, including a wider use of the Internet to handle day-to-day chores.   Under the "Smart City Blueprint for Hong Kong", the Government has progressively launched various Smart Government initiatives with a view to providing better quality services to the public.

3.   I&T development has posed unprecedented challenges to policing duties but at the same time brought new development opportunities. In view of this, the HKPF have included Digital Policing as one of its Strategic Directions since 2019 to drive I&T for policing, with

a view to providing better services to the public, improving internal operation and streamlining work procedures to increase efficiency, and strengthening digital capability for criminal investigation. So far, the HKPF have rolled out over 40 Digital Policing initiatives, including:

(a) Introduce new digital solutions to enhance service accessibility to the public

Electronic Service

4.   The HKPF is making it more convenient for the public to submit, review and follow up on applications by enhancing its existing electronic services, including the introduction of online applications and payment services for eight types of licences and permits[1]. The HKPF will gradually expand the types of online applications for licences and permits, including the Certificate of No Criminal Conviction, Closed Area Permit, etc.

Self-Service

5.   The HKPF have established the "e-Report Centre" platform that allows the public to handle non-emergency cases without reporting at police stations in person. In 2022, the HKPF have set up "self-service kiosks" in designated police report rooms for members of the public to report lost property cases by themselves without having to wait for counter service, which greatly reduced the waiting time for the public and enabled frontline police officers to handle other police work more efficiently.

"3R Solution"

6.   In 2022, the HKPF self-developed the Rescue Map solution combining R-Map, R-Cam and R-Watch for a real-time sharing of information and better monitoring of the situation at the rescue scenes by the participating rescue units. Apart from enhancing the effectiveness of

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[1] Including (1) Arms Licence, (2) Massage Establishments Licence, (3) Playing Musical Instrument Permit, (4) Pawnbrokers Licence, (5) Temporary Liquor Licence, (6) Lion/Dragon/Unicorn Dance Permit, (7) Security Personnel Permit, and (8) Societies Registration.

search and rescue operations, the Rescue Map solution can also better protect the safety of rescue personnel.

(b) Enhance the use of digital technology to improve the efficiency of law enforcement

"e-Ticketing"

7.　　　Through continuous testing and development of new mobile applications and systems, the HKPF have accelerated the pace of digitising the manual procedures, thereby improving the enforcement efficiency and quality, such as the use of "e-Ticketing" to strengthen enforcement actions against illegal parking and improve traffic congestion caused by illegal parking.

"Project PROVE"

8.　　　In view of the fact that many vehicles are now installed with vehicle recording device, the HKPF launched "Project PROVE" in 2022 to facilitate members of the public to provide information such as pictures and videos to report traffic violations, thereby strengthening the enforcement actions against traffic offences, promoting good driving behavior and enhancing road safety.

"e-154 App"

9.　　　In 2021, the HKPF introduced the voice input technology "e-154 App".　With portable devices issued to frontline crime officers, informants can give statements more efficiently at a place other than police stations.

(c)　　Leverage on technologies to streamline work procedures and improve internal management

Enhancement of infrastructure and equipment

10.　　　Through construction of a new digital highway to leverage on advanced technologies such as optical fiber and WiFi, increase in the

provision of mobile devices and equipment such as smartphones, tablet computers and Body Worn Video Cameras, coupled with the development of new mobile applications, the HKPF aim to improve connection among police officers and the speed of multi-media data transmission, thereby enhancing the HKPF's capabilities in evidence collection, operational command, manpower deployment mobility and resilience.

Strengthen IT security

11.		With digitisation of information and a wider use of mobile devices and equipment in handling police work, it is important to have stringent IT security controls. Therefore, the design and procurement of all new technology solutions must take into account the needs of IT security. IT security can be twofold. Firstly, we need to guard against inappropriate access to information systems or equipment and malicious cyberattacks to prevent situations such as data breach, misuse of information and system failure. Secondly, we need to ensure the stability of supply, repair and maintenance. With the increasing geopolitical tensions, some technology products and technologies have been prohibited from exporting to Hong Kong, leading to increased potential risk in this regard.

Identify and develop IT-related human resources

12.		To implement Digital Policing in a more effective manner and promote I&T culture in the HKPF, police officers should have the capability of using technology. In this regard, the HKPF organise technology workshops and competitions to enable police officers to keep abreast of the developments in I&T. The HKPF have also launched a new internal video platform "P-TV", which serves to introduce the latest technologies used by the HKPF and present technological knowledge in an easy-to-understand manner, allowing police officers to allocate their time flexibly in learning new technologies.

13.		In summary, Digital Policing covers a wide range of areas that aim to enhance the operational effectiveness of the HKPF and provide excellent policing services to the public.

Major IT projects proposed for implementation in the coming years

14.　　Since its launch in 2019, Digital Policing has continued to enhance police capabilities through the application of technology to protect the lives and properties of the public, and strengthen cooperation and liaison with the society and relevant agencies to jointly safeguard national security and combat crime.　To continue to expand Digital Policing and deepen its achievements, the HKPF must further enhance its command and communications, image processing and human resource management, so that the HKPF's infrastructure is equipped with up-to-date technology to support the application of I&T and better meet the ever-changing challenges of the digital age.　In this regard, the HKPF propose the implementation of the following three major IT projects in the coming years.

(a) Next Generation Communications System (NGCS) Infrastructure

15.　　The HKPF's Command and Control Communications System (CCCS) has been in operation since 1980s.　Apart from supporting the HKPF in handling urgent tasks and daily operation, it also provides inter-departmental internal communications service to the participating departments[2] of the Unified Digital Communications Platform (UDCP) during joint operations to handle emergencies.

16.　　Over the past 40 years, the CCCS has undergone several major upgrades, with the existing system adopting the Terrestrial Trunked Radio (TETRA) technology.　TETRA is a radio communications standard developed by the European Telecommunications Standards Institute (ETSI) in 1995.　Through air interface encryption, it is used in the daily operation of law enforcement agencies for the protection of public safety, and during emergency or disaster relief operations to provide mission

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[2]　Participating departments include Auxiliary Medical Service , Civil Aid Service (CAS), Customs and Excise Department, Civil Engineering and Development Department, Correctional Services Department, Government Flying Service, Department of Health, Electrical and Mechanical Services Department, Fire Services Department and Security Bureau.

critical communication services by transmitting voice and simple text messages.

17.   The most recent replacement and upgrade of the CCCS was approved by the Finance Committee (FC) of the Legislative Council (LegCo) in 2016. $855 million was approved to replace and upgrade the 999 Emergency Telephone System, the Computer-assisted Command and Control System, and two sub-systems (including radio communication devices and microwave link facilities) under the Integrated Communications System.   Since the mobile broadband standard for mission critical communication services was not yet mature and no suitable spectrum was available at that time, the relevant works maintain the use of TETRA technology without upgrading the technology and infrastructure for mobile communications.

18.   Although TETRA has been providing secure and reliable voice communication services, it is constrained by its narrow bandwidth.   At present, frontline officers can only verbally report the circumstances at scene to console operators and commanders at the command centre.   They are unable to send real-time information in the forms of audio, video and image, causing information on the situation at scene and discharge of duty being fragmented, and may even have omissions and incomplete communication at times.   The voice-centric TETRA technology also poses limitations on the co-ordination of participating departments under emergency situations.   With the development of technologies, the development and application of multi-media messaging has become increasingly popular, the limitation of TETRA's narrow bandwidth could not meet the current day policing needs.

19.   In the era of digital information, streaming of massive amount of texts, images, videos and information in other emerging formats is required in police work.   Although the HKPF has been actively building fiber optic and wireless local area networks to connect its command and control centers and offices in recent years to speed up multimedia data transmission and assist in operational command and manpower deployment, these new facilities can only be used at police premises.   In streets, public, private and commercial areas, the HKPF can only use TETRA system with narrow bandwidth technology for voice transmission,

thus creating a large communication gap. In particular, when dealing with situations such as unexpected incidents, bad weather and mountain search and rescue, etc., which require every precious second to save lives and properties, the current TETRA technology is evidently inadequate and must be updated.

20.   As a matter of fact, using mobile broadband to replace TETRA technology has become a global trend. Law enforcement agencies of countries in the Asia-Pacific region (such as Mainland China, South Korea and Thailand), Europe (such as Belgium, Germany and United Kingdom), America (such as Canada and the USA) and Middle East (such as Dubai and Qatar) have already introduced mobile broadband as their main communications technology. Taking the Mainland China as an example, to realise high-speed and high-volume transmission of multi-media data as required by Digital Policing, major cities such as Shanghai and Hangzhou have gradually introduced Long Term Evolution (LTE) or 5G as the backbone technology of their communications systems.

21.   The development of 5G network does not only solve the problem of system obsolescence caused by old technologies, but also significantly improve the operational efficiency of police work and emergency services. 5G will provide high speed, low latency and massive connectivity to enable new and more effective policing services, and render support for inter-departmental law enforcement and emergency services. The development of 5G is now mature, and the replacement and upgrading of the CCCS in 2016 has laid a good foundation for the introduction of 5G. We believe that it is the appropriate time to replace the outdated TETRA technology with mobile broadband to improve the speed, capacity, usability and security of the police communications system[3].

22.   The HKPF proposes to build the NGCS to improve the operational efficiency of policing and emergency services, address national security needs, and reduce the potential risks associated with geopolitical

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[3]   2 x 10 MHz of the spectrum in 700 MHz band has been reserved by the Office of the Communications Authority for departments under the purview of the Security Bureau, including the HKPF, for communication and public safety purposes.

tensions by establishing a reliable, highly stable, sustainable, and more secure communications network.   The NGCS can optimize the efficiency of police officers' front line duties, including real-time transmission of voice, video and picture messages, as well as efficient access and sharing of multimedia information in emergency situations to protect public safety and fight crimes.   The HKPF can also develop more innovative technology applications based on 5G to meet current and future policing needs.

23.   In terms of the system architecture, taking into account factors including national security, security and reliability requirements of the communications services and cost-effectiveness etc., the Government proposes to adopt a hybrid model where the infrastructure of the NGCS will be primarily developed by the Government, complemented by commercial services.   The Government will build and operate the core network and base stations of the system to meet the stringent requirements of mission critical communications, while engaging commercial network services to take advantage of their large number of base stations and wide coverage.   The project will also include the acquisition of communications system equipment, including consoles, communications equipment and digital transmission networks.

24.   Due to the complex design and security considerations involved in the construction of the NGCS, it is preliminary estimated that the project will involve a non-recurrent expenditure of about $5.2 billion, which includes -

  (a) About $940 million for the acquisition of hardware and software required for the **core network**, including the establishment of core network servers, network management systems, provision of subsystems for authentication, privilege management, policy control (e.g. control of access to relevant internal information and communications systems, etc.) and telephone and Internet communication gateways, etc.;

(b) About $340 million for the procurement of hardware server platforms and software for **mission critical communications platforms**;

(c) About $860 million for the acquisition and construction of **radio access network (i.e. about 500 base stations)** to be distributed and installed at various strategic locations throughout the territory;

(d) About $600 million for the leasing of **mobile broadband networks** from public mobile network operators to enhance the overall coverage and availability;

(e) About $410 million for the procurement of **transmission backbone equipment** to connect the wireless access network (i.e. base stations) to the core network;

(f) About $800 million for the procurement of **communication consoles modems (about 600 sets)** and communications facilities, including radios **(about 33 000 sets)** and their accessories, etc; and

(g) About $1.25 billion for engineering and professional services (e.g. site survey, design and installation), interface integration, relocation, staff training and contingency, etc.

25.   The non-recurrent expenditure is expected to be spent across six years (from 2025-26 to 2030-31).   As far as recurrent expenditure is concerned, the HKPF is assessing the required amount, which includes the maintenance of the hardware and software of the systems, communication network, communication consoles and radios, payment of expenses for system support (including contract staff), and rental of shared services of the radio access network provided by the public mobile network operator, etc..   The recurrent expenditure involved is expected to be partly offset by savings in the maintenance of the existing system.

26.   The HKPF is conducting an in-depth study and a parallel tendering exercise for the project, and will make a detailed briefing to the

Panel on the relevant financial proposal in due course.   Subject to the support of the Panel, the Government plans to seek funding approval from the FC of the LegCo in the 2025-26 to take forward the project.   If funding approval is obtained from the FC, it is expected that the first phase of the service can be launched about one and a half years after the contract is awarded.

(b) Centralised Digital Image Platform (CDIP)

27.   The HKPF's frontline units have the operational needs to record or collect video footages when discharging duties for purposes such as evidence collection and intelligence analysis.   At present, all video footages collected will be duplicated through the terminal of the Integrated Digital Storage Media Duplication System (duplicating station) and stored in DVDs.   In recent years, the number of video footages processed by the HKPF has been increasing and the duplication workload of the duplicating stations has become heavier.   In 2021, the number of video footages duplicated increased by 65%, and the data size of the video files nearly tripled as compared to those in 2018.   The HKPF expect that the demand for processing video footages will continue to increase.

28.   Currently, officers responsible for duplicating video footages must save them in DVDs through the duplicating stations and then properly store the working copies of DVDs in the respective offices.   Without a centralised repository to store the videos, other officers are unable to immediately identify and retrieve videos with intelligence or evidential value, and DVDs are subject to loss or damage during storage. Furthermore, the current procedure does not maintain a complete audit log to document the history of disc usage and prevent unauthorized access.

29.   To enhance information security, operational efficiency, and investigative and intelligence capabilities, the HKPF proposes to build an integrated centralised platform for proper storage, processing, retrieval and sharing of multimedia files with intelligence or evidential value.   Through the centralised and secured server of the CDIP, as well as identity authentication, access control and audit trail functions, information security can be enhanced and the possibility of improper use of data or violation of the Personal Data (Privacy) Ordinance can be reduced.   The

work of duplicating DVDs is no longer required upon launching the CDIP, as the CDIP will automatically back up a video recording uploaded by generating a master copy and a working copy of it.   Master copies will be stored in the centralised secured server of the CDIP to ensure data integrity so that they can be adduced as exhibits in court.   In addition, the platform effectively enhances the information security of related processes and reduces the risk of data loss, destruction, improper access or use, which is crucial for the HKPF to maintain national and public security.

30.   With the launch of the proposed platform, police officers will be able to retrieve digital images more systematically from a centralised platform and identify videos with investigative or intelligence value more quickly, and be able to apply for video viewing directly to the team-in-charge via the platform, effectively facilitating intelligence analysis and exchange, thereby speeding up the investigation of cases.   In addition, the platform's system configuration is compatible with other artificial intelligence image analysis tools to facilitate more efficient and accurate targeting of suspicious persons and identification of other case-related objects, such as suspicious vehicles, in the future.   The platform and its extensible technology applications will substantially promote HKPF's case detection and intelligence analysis capabilities, especially for cross-regional criminal activities, such as various types of deception cases, and cases involving national and public security.

31.   To cope with increasing volume of video collection and higher file resolution requirements, the HKPF will optimize the corresponding network infrastructure to enhance the transmission speed of video files for uploading and downloading on the CDIP.   The launch of the platform will not only improve the efficiency of relevant police work, but also release the existing manpower resources engaged by the cumbersome video processing procedures.   With the proposed platform replacing the existing digital image processing procedures, it is estimated that a total of 1,376 man-months (i.e. about 240,000 man-hours) per year will be saved. These released manpower resources can be redeployed to other core policing tasks, particularly in the maintenance of law and order, crime prevention and detection, in accordance with operational needs and actual situation.

32.   The HKPF has earlier issued a Request for Information (RFI) to service providers in the market on the project requirements, inviting contractors to provide estimates for the project expenditure.   Based on the information obtained, it is preliminary estimated that the project will involve a non-recurrent expenditure of about **$390 million**, which includes -

(a) About $240 million for the acquisition of **computer hardware** for the CDIP, including servers, storage, backup equipment, etc., and the associated computer software for the platform;

(b) About $76 million for the acquisition of **communications and network equipment** to connect the computers and servers, and to lay high-speed data transmission lines between the Police Headquarters and the offices;

(c) About $20 million for engaging service providers to provide **system development**, support and maintenance services, etc.;

(d) About $17 million for engaging contract IT staff to provide **project management services**, including project planning and monitoring, preparation of tender-related matters, liaison with project stakeholders, support for application development and system acceptance tests, etc.; and

(e) About $37 million for site preparation works, staff training, Security Risk Assessment and Audit, Privacy Impact Assessment and contingency, etc.

33.   The non-recurrent expenditure is expected to be spent across six years (from 2024-25 to 2029-30).   In terms of recurrent expenditure, HKPF is assessing the required amount, which includes the maintenance of the hardware and software, communication network, and the system, payment of expenses for contract staff and consumables.   However, with more efficient video processing, transmission, retrieval and sharing processes and cost savings in the procurement of DVDs, the platform will

save staff and related expenses of the existing front-line units for digital video processing. The released manpower will be redeployed to perform other core policing duties as appropriate to enhance operational efficiency and service quality.

34. The HKPF is conducting a parallel tendering exercise for the project and will make a detailed briefing to the Panel on the relevant financial proposal in due course. Subject to the Panel's support, the Government plans to seek funding approval from the FC in 2024-25 to take forward the project. If funding approval is obtained from the FC, it is expected that the first phase of the service can be launched about two years after the award of the contract.

(c) Personnel Information Communal System III (PICS III)

35. The HKPF launched the Second Generation Personnel Information Communal System (PICS II) in 2013 to manage the human resources records of about 36 000 regular, auxiliary and civilian members of the HKPF and the administration of personnel matters within HKPF. During the serious violence in 2019, there had been breaches of personal data of police officers and their family members. The HKPF considers it necessary to strengthen the security features of the system to prevent any data breaches from happening again. Besides, as the PICS II has been in use for nearly a decade, the business intelligence solution used in the system has been discontinued, and U.S. sanctions against the HKPF have caused the provider of the PICS II database and associated management system to put the renewal of its service contract with the HKPF on hold in early 2021. Continued use of unsupported software will affect the reliability of the system and may even expose the system to security vulnerabilities.

36. The HKPF proposes to replace the existing PICS II by migrating the entire core database to the new management system. The database could then be properly maintained and lock-out by vendors could be avoided. In addition to replacing the old database solution, new business intelligence solution shall be introduced into the applications

platform to optimize human resources management and enhance analytics capabilities.

37.   PICS III will conduct comprehensive staff analysis using artificial intelligence to support the HKPF in making appropriate human resources deployment.   Besides, the new system will digitise all applications relating to personnel and welfare services, so as to provide more accessible personnel and welfare services to police officers.   The new system will adopt open source software as appropriate to ensure system autonomy and flexibility, so that it will no longer be affected by the actions or decisions of the service providers.   Furthermore, the new system will strengthen IT security through the use of watermark technology.

38.   In sum, the new system will enable the electronic delivery of a wide range of personnel services in the HKPF.   Through the use of advanced technology, the system will help optimize the internal operations and procedures of the HKPF and facilitate the full implementation of Digital Policing.   With the introduction of artificial intelligence analysis, the talents of officers can be realized and implemented, and the management can make more accurate manpower and job deployment according to the strengths of officers, which will directly enhance the service level of the HKPF to the public.   At the same time, the enhanced IT security function can strengthen the protection of personal information of police officers and their families to prevent data leakage.

39.   The HKPF has made a cost estimation for the project earlier. Based on the information available, it is preliminary estimated that the project will involve a non-recurrent expenditure of about **$190 million**, which includes -

> (a) About $100 million for system design, development and installation, and security risk assessment and audit;
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> (b) About $50 million for the acquisition of **computer software**, including system software and software packages;

(c) About $20 million for the acquisition of **computer hardware**, including system servers, storage devices and system backup equipment, etc.; and

(d) About $20 million for **employing contract staff** to support project planning, monitoring and conducting system acceptance tests and contingency, etc.

40.		The non-recurrent expenditure is expected to be spent across four years (from 2024-25 to 2027-28). As far as recurrent expenditure is concerned, the HKPF is assessing the required amount, which includes the maintenance of hardware and software, payment of expenses for system support and contract staff services, etc.. The recurrent expenditure involved is expected to be partly offset by savings in the maintenance and operating expenses of the existing system.

41.		The HKPF is conducting parallel tendering exercise for the project and will make a detailed briefing to the Panel on the financial proposal in due course. Subject to the Panel's support, the Government plans to seek funding approval from the FC in 2024-25 to take forward the project. If funding approval is obtained from the FC, it is expected that the first phase of the service can be launched about two years after the award of the contract.

ADVICE SOUGHT

42.		Members are invited to take note of the latest development of Digital Policing, and provide views on the proposed implementation of the major I&T proposals in the coming years.

Security Bureau
Hong Kong Police Force
March 2023