For information
on 15 April 2005

Legislative Council Panel on Security

Computer Assisted Palmprint and Fingerprint Identification System

Introduction

This paper presents the proposal to replace the Computer Assisted Fingerprint Identification System (CAFIS) of the Hong Kong Police Force (HKPF) by a Computer Assisted Palmprint and Fingerprint Identification System (CAPFIS).

Background

2. On 29 January 1993 and 19 July 1996, the Finance Committee approved respectively a commitment of $299.37 million (later revised to $289.77 million) and an increase in commitment of $66 million for the full implementation of the Information Technology Strategy of the then Royal Hong Kong Police Force. The strategy is made up of a number of elements, one of which is CAFIS. CAFIS has been in place since 1997 and has played a crucial role in the effective operation of the criminal justice system of Hong Kong. As at the end of 2004, the CAFIS databases consisted of about 903 000 tenprints and 56 000 latent prints. 'Tenprints' refer to fingerprints taken from convicted persons, where all ten fingers are inked and recorded. 'Latent prints' are prints collected from scenes of crime or exhibits. In addition, the CAFIS databases temporarily store the tenprints of arrested persons pending trial. These fingerprints are destroyed once the person involved is discharged.

3. CAFIS provides centralized fingerprint services to all end-users in the criminal justice system by helping to -

(a) <u>Establish a subject's identity and criminal history</u>
Each person's fingerprints are unique. Fingerprints are therefore a very reliable means to establish a person's identity. When a person is arrested by the Law Enforcement Agencies (LEAs), including the HKPF, Immigration Department, Customs & Excise Department and Independent Commission Against Corruption, a CAFIS search will establish the subject's true identity if his fingerprints have already been captured in the CAFIS databases. If there is a positive match, the corresponding

reference number in the Criminal Records Bureau of the HKPF will reveal the subject's criminal history.

(b) Facilitate court sentencing

There is a long standing requirement for all LEAs to provide a complete criminal record of a convicted person to assist the courts in the awarding of sentences. A CAFIS search followed by a corresponding criminal records search, if applicable, helps to provide the necessary record.

(c) Investigate crime

CAFIS is a very powerful tool in assisting crime investigation conducted by the LEAs. Fingerprint is one of the important trace evidence left at a crime scene by the criminal in the course of committing an offence, which is always an irrefutable proof to connect a suspect with a crime. CAFIS enables speedy searching of fingerprints recovered from crime scenes/exhibits against a convicted person's prints already filed in the system database. Likewise, an arrested person's fingerprints can be checked against the database of unsolved crime-related fingerprints. CAFIS is pivotal to achieving swift identification of suspect(s) to a crime.

(d) Provide ancillary services

CAFIS provides reliable ancillary services such as those in relation to the applications for Certificates of No Criminal Conviction for emigration purposes and requests for access to Criminal Conviction Data Record under the Personal Data (Privacy) Ordinance. A CAFIS search will indicate whether a person is a convicted person.

4. To ensure the effective and reliable operation of fingerprint searches, it is necessary for the computer system to maintain complete and correct fingerprint databases.

The Need to Replace CAFIS by CAPFIS

5. The HKPF has undertaken a review of CAFIS, taking into account the operational need of the LEAs and technological advances in the last decade. According to the outcome of the review, the tenprint and latent fingerprint archives are now reaching nearly 83% and 90% of the designed ceiling respectively. With the tenprint and latent print databases growing at about 5% and 3% per annum, CAFIS is expected to reach its maximum

capacity in 2008 for both databases. When the hardware capacity reaches its ceiling, CAFIS will not be able to accept new fingerprint records without removing existing records from the system. This would lead to unreliable matching results and would be totally unacceptable from the law enforcement and criminal justice points of view. One option is to expand the hardware capacity of CAFIS to accommodate the continuous growth of the fingerprint databases. However, the sole supplier for the necessary hardware (e.g. disc, matching equipment) for upgrading the existing CAFIS has discontinued production of the hardware.

6. In view of the above, we propose to replace CAFIS with a new system that can better meet the LEAs' operational requirements. The proposed CAPFIS will have the following major benefits, as compared to the existing CAFIS –

(a) At present CAFIS, on its own, is maintaining a search accuracy of 99% for the search of tenprints against the tenprint database, and 80% for the search of latent prints against the tenprint database. In line with established international practice, the list of suggested target prints generated by CAFIS following a search is further processed and verified manually to ensure there will absolutely be no "wrong identification". This manual processing part inevitably takes time and is often the "bottleneck" of the entire matching process. Nevertheless, continued development of new algorithm, in particular for latent print searches, has enabled improvements to the process. Currently leading vendors in the market are able to provide more sophisticated search algorithm for improving accuracy rate of a computer search of latent prints up to 90%. With the implementation of CAPFIS, we will be able to make use of the new technology to enhance the efficiency of the investigation process.

(b) The proposed CAPFIS will allow for expansion of hardware capacity to accommodate the anticipated future growth of the latent print and tenprint databases.

(c) The existing CAFIS was built on a standalone computer system infrastructure and lacks inter-connectivity capability with other computer systems. Moreover, the input to and output from the system are not compliant with the internationally-accepted standards for fingerprint transmission set by the National Institute of Standards and Technology (NIST), which were

approved by Interpol in July 2000. The proposed CAPFIS will conform to NIST standards and allow better exchange of intelligence among local LEAs and with overseas agencies in combating terrorism and cross-boundary crimes.

(d) The proposed CAPFIS will have a faster processing speed, thereby enhancing search efficiency, which is critical for the speedy identification and apprehension of suspects. Specifically, in processing a latent fingerprint for crime investigation, the new system is capable of producing search results in 10 minutes whilst the existing CAFIS would need 40 minutes.

7. Moreover, an added feature of the proposed CAPFIS is its ability to handle palmprints, on top of fingerprints. The computerised identification technology is moving on a fast track, in particular the rapid technological advances in palmprint identification which is heralded as the greatest breakthrough in the fingerprint community. Such technology has already been utilized worldwide by many overseas LEAs in crime investigation and is producing good results.

8. In Hong Kong, the number of latent fingerprints and palmprints discovered at scenes of crime/exhibits in 2004 are about 28 400 and 8 100 respectively. Currently around 35% of the unsolved latent marks are palmprints, which could only lie dormant until suspects are identified whose palmprints can then be collected for manual comparison against the latent prints discovered. Because of such limitation, valuable evidence of palmprints could not be used for bringing offenders to justice.

9. In addition, according to experience, there is difficulty in recording good quality fingerprints for about 1% of arrested persons due to their skin conditions. However, they can still have good palm skin conditions and palmprint identification would then be a better solution than fingerprints.

10. The proposal to replace CAFIS by CAPFIS has the support of the Office of the Government Chief Information Officer.

Financial Implications

11. Drawing reference from the information systems currently used by the Police and market surveys, we estimate that implementation of CAPFIS will require a non-recurrent commitment of $59,576,000 over a three-year period from 2005-06 to 2007-08 for the acquisition of computer hardware, software and related services. Detailed breakdown is at Annex A. As for additional recurrent expenditure, we estimate that it will amount to $7,132,000 in a full year from 2008-09 onwards. Detailed breakdown is at Annex B. The additional recurrent cost will be absorbed by the existing resources.

Implementation Plan

12. Subject to funding approval, we plan to have CAPFIS fully implemented by 2008. A detailed implementation plan is at Annex C.

Security Bureau
April 2005

Annex A

Breakdown of Non-recurrent Cost of Implementing CAPFIS

Non-recurrent cost	2005-06 $'000	2006-07 $'000	2007-08 $'000	Total $'000
(a) Hardware and software		22,280	22,280	44,560
(b) System development and implementation services		3,500	3,500	7,000
(c) Data conversion services		2,500	2,500	5,000
(d) Project management	472	472	472	1,416
(e) Miscellaneous (training, site preparation, consumables, etc.)		800	800	1,600
Total	472	29,552	29,552	59,576

Annex B

Breakdown of Additional Recurrent Cost of Implementing CAPFIS

	2008-09 and onwards $'000
(a) Hardware and software maintenance	5,906
(b) Consumables	100
(c) Communication network	22
(d) System maintenance	2,261
Sub-total	8,289
Less	
(e) Recurrent cost of existing system (CAFIS)	1,157
Total additional recurrent cost	7,132

Annex C

Implementation Plan of CAPFIS

Activity	Target completion date
(a) Tendering for the supply of hardware, software and implementation services	March 2006
(b) System development and implementation	February 2007
(c) Data conversion	February 2007
(d) Replacement of existing CAFIS	March 2007
(e) System interface development and implementation	February 2008
(f) System roll-out	March 2008
(g) System nursing	September 2008