For discussion
28 January 2000

Legislative Council Panel on Security

New Command and Control Communications System for Operations Department of Hong Kong Police Force

Purpose

This paper informs Members of a plan to acquire a new command and control communications system to replace the ones currently used by front-line officers of the Operations Department of the Police including beat officers, and officers of Traffic Branch, Police Tactical Unit (PTU) and Emergency Unit (EU).

Background

The current command and control communications system

2. The current command and control communications system (CCII) used by beat officers was introduced in 1990. It comprises an integrated communications system (commonly known as the beat radio system), the 999 emergency services telephone sub-system and the Enhanced Computer Assisted Command and Control System (ECACCS). The primary function of ECACCS is to provide a comprehensive computerized command and control facility in conjunction with the beat radio network and the 999 emergency services. Terminals are installed at the three regional command and control centres (RCCC) to support controllers in handling and deployment of resources to scenes of incidents, and at all police stations in

tracking and taking follow-up actions on divisional incidents. Details of all incidents reported through 999 or at police stations are entered in ECACCS which will verify the locations and pass the information to the divisional console concerned automatically for deployment of resources if necessary. ECACCS provides computer service coverage for both routine policing as well as internal security and major incident situations. Interfaced with the Enhanced Police Operational Nominal Index Computer System (EPONICS), it also provides information including the "Wanted or Missing Persons" and vehicles of interest in support of Police "stop and search" operations on the streets.

3. The equipment of CCII will reach the end of its useful life by 2004. Equipment, in particular the beat radios and repeaters, is aging with increasing breakdowns. The maintenance costs for the beat radio system are rising. In addition, as the technology currently used in CCII is proprietary to a particular vendor, the Police have no choice but continue to stick to the same manufacturer for acquiring equipment or services for the system. The Police have also encountered increasing difficulty in obtaining spare parts for the beat radio system as the production of beat radios has been discontinued since 1997. Based on the vendor's commitment to supply spare components until 2002 and the past maintenance records of the system, the Police estimate that they may only be able to upkeep the existing beat radio system until 2004.

4. In addition, with the changes in geographical distribution of the population and the public's rising demand on the quality of services provided by the Police, CCII can no longer fully meet the Police's present operational requirements. Its major deficiencies include -

(a) the infrastructure of the current beat radio system is overloaded and cannot take up signals from additional repeaters, which may affect the response time if there is any surge of calls;

(b) as the analogue technology used for the infrastructure in the beat radio system has only limited bandwidth, the system cannot support data and images transmission to facilitate Police's operations;

(c) the existing ECACCS is a text-based system with no graphical user interface provided. It operates with a command line interface which requires users to be familiar with the command codes and syntax and hence is not user friendly. The current system also cannot support bilingual processing and do not accept the use of Chinese names, which would be more convenient in many cases. In addition, with no interface with the Formation Information Communal System, it makes direct exchange of incident and statistical data between the RCCCs and Divisions extremely difficult;

(d) the existing ECACCS offers no data encryption capability. There is a risk of eavesdropping by outsiders;

(e) the existing 999 emergency services telephone sub-system is connected to the PABX system of the buildings that each of the three RCCCs is located. Any upgrading or enhancement of the sub-system has to be conducted in conjunction with the whole PABX system and hence will be both expensive and difficult; and

(f) CCII was designed in the late 1980s and does not provide full radio coverage over the territory. For example, developing towns such as Tin Shui Wai, Ma On Shan and Tseung Kwun O need to be covered by making use of the repeaters reserved for future development. As the reserved expansion capacity of CCII has been exhausted, some new development areas may become blindspots under the existing system.

Radio systems used by Traffic Branch, PTU and EU

5. At present, as beat officers, Traffic Branch, PTU and EU are using their own radio systems, cross communication with the same radio is not possible. In joint operations, officers may need to bring along more than one radio, which is very undesirable from the operational point of view.

The proposed system

6. The Police have conducted a thorough study of their operational requirements and propose to replace CCII by a new digital command and control communications system. The new system can better meet the Police's current and future operational requirements. Its main characteristics are set out below -

(a) its digital radio and computer infrastructure is of open standard and expandable. Equipment such as beat radios will no longer be proprietary and hence can be procured from open markets. In addition, the new system allows an incremental approach to development and system enhancement without major changes in future, which should be more cost effective in the long run;

(b) it can provide a wider radio coverage to include all areas essential for Police operations;

(c) it provides an unified and integrated communications platforms for beat officers, and officers working in Traffic Branch, PTU and EU;

(d) it has sufficient interference-free high speed data channels to allow transmission of not only voice but also data and images. Based on the results of some internal trials, mobile data terminals (a mobile computing facility) will be installed at Police vehicles and vessels to equip them with the capability to provide voice and data communications simultaneously. Depending on the findings of a consultancy study, such mobile computing facility may also be extended to cover beat officers;

(e) its new digitized transmission platform will greatly enhance the security protection against eavesdropping and unauthorized access;

(f) a Geographical Information System with the capabilities for electronic mapping and analysis of objects with geographic nature will be installed;

(g) it also has an Automatic Vehicle Location (AVL) system, which integrated with the Global Positioning System (GPS) and Geographical Information System (GIS), can keep track the positions of Police vehicles and vessels on electronic maps;

(h) the new ECACCS does not require data to be input with fixed command codes and syntax and is more user-friendly; and

(i) the new 999 emergency telephone sub-system enables 999 calls be passed within the same RCCC (i.e. intra-flow) or to the other two RCCCs (i.e. inter-flow) automatically if there is a sudden surge of calls in one centre. In addition, the new 999 emergency telephone sub-system will be built on its own PABX system and hence future upgrading will be much easier and less expensive.

7. The proposed system can further improve the Police services provided to the public in the following ways -

(a) with the provision of the mobile computing facility, officers in patrol vehicles and vessels will have direct access to various information systems such as EPONICS, Transport Department's Vehicle and Driver Licensing Information Data System and Immigration Department's Registration of Person System. Such facility can greatly improve the utilization and efficiency of the communications system and enhance the quality of services provided by the Police. For example, ID checks can be conducted directly through the mobile data terminals instead of requesting the RCCC operators to perform the checking. The average time required for such a check is expected to be reduced by 10 to 15 seconds. In result, more radio channels and RCCC operators can be freed for voice communications of higher priority and other urgent tasks. With the facility, Police vehicles and vessels can also function as mobile reporting centres and the public can make crime reports on the spot;

(b) the new 999 telephone sub-system can provide speedier response to any sudden surge of 999 calls;

(c) the proposed system can facilitate the deployment of resources and hence strengthen Police's capability in preventing and detecting crimes. For example, serving as an integrated communications system for beat officers, and officers of Traffic Branch, PTU and EU, the new system can improve the communication among these front-line officers and facilitate the deployment of resources in large scale operations. In addition, with the AVL system and GIS, RCCCs can keep track of the positions of all Police vehicles and vessels on electronic maps, which allows more flexible and efficient deployment of resources and faster tactical response to incidents.

Cost estimation

8. It is estimated that the non-recurrent cost of the proposed command and control communications system will be $998 million, broken down as follows -

		$million
(a)	Command control and network management sub-system	100.00
(b)	Radio repeater sub-system	74.00
(c)	Backbone radio relay sub-system	30.00

(d)	Subscriber radios with encryption	360.00
(e)	999 emergency telephone sub-system	15.00
(f)	AVL and GIS	66.50
(g)	ECACCS	78.00
(h)	Mobile computing sub-system	68.50
(i)	Project management (employment of contract staff)	48.35
(j)	Consultancy study	20.00
(k)	Supporting services (including site preparation, installation, training and documentation)	44.00
(l)	Maintenance, test equipment and spares for the first year	58.00
(m)	Radio spectrum licence fee and tarrif for leased line rental	15.00
(n)	Contingency	20.65
	Total:	**998**

Implementation plan

9. The Police plan to implement the proposed system according to the following schedule -

		Target completion date
(a)	System design	April 2000 to July 2001
(b)	Tendering and award of contract	August 2001 to April 2002
(c)	Delivery of equipment, installation, acceptance tests and training	May 2002 to December 2003
(d)	System Commissioning and phased roll-out	January to December 2004

Other alternatives considered

10. Instead of acquiring a new system, we have examined the feasibility of upgrading the present system. However, it is considered that it will not be cost effective to do so as the infrastructure of the existing system is approaching the end of its life expectancy and some of its equipment is beyond economical repair. Piece-meal replacement is also not recommended as there are inter-connections between the beat radio system, the 999 telephone emergency services telephone sub-system and ECACCS.

Security Bureau
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