ITEM FOR FINANCE COMMITTEE

CAPITAL WORKS RESERVE FUND
HEAD 708 - CAPITAL SUBVENTIONS AND MAJOR SYSTEMS AND
EQUIPMENT
Hong Kong Police Force
New Subhead "Replacement of Command and Control Communications
System for the Operations Department of the Hong Kong Police Force"

> Members are invited to approve the creation of a new commitment of $948 million to replace the Command and Control Communications System of the Operations Department of the Hong Kong Police Force.

PROBLEM

The existing mission critical Command and Control Communications System (CC II), which has significant maintenance problems and operational deficiencies, will reach the end of its useful life by 2004.

PROPOSAL

2.   The Commissioner of Police, with the support of the Secretary for Security, proposes to acquire a new Command and Control Communications System (CC III) to replace the one currently used by front-line officers of the Operations Department of the Hong Kong Police Force (HKPF), including beat patrol officers, and patrol officers deployed to Traffic Branch, the Police Tactical Unit (PTU) and the Emergency Unit (EU).

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JUSTIFICATION

Functions of the current system

3.   CC II was introduced in 1990 at a cost of around $410 million. It comprises the Integrated Communications System (commonly known as the 'Beat Radio System'), the 999 Emergency Services Telephone Sub-system (999 Sub-system) and the Enhanced Computer-assisted Command and Control System (ECACCS).

4.   The Beat Radio System and the 999 Sub-system are supported by ECACCS which is a comprehensive computerised command and control facility for effective and efficient deployment of police resources to scenes of incidents. ECACCS comprises a back-end computer-aided dispatch system with front-end console terminals installed at the three Regional Command and Control Centres (RCCC) and local Police stations to support controllers in resource deployment. Details of all incidents reported through the Beat Radio System, the 999 Sub-system or at HKPF stations are input into ECACCS, which then verifies the location and automatically routes the information to the relevant divisional console for deployment of resources. 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) and the Transport Department's Vehicle and Licensing Identification System (VALID), and with restricted access to the Immigration Department's Registration of Persons System (ROPS), ECACCS also provides information including wanted and missing persons and vehicles of interest in support of HKPF operational activities on the streets.

Maintenance problems with the current system

5.   CC II equipment, particularly the Beat Radio System and the 999 Sub-system, will reach the end of its useful life by the end of 2004. Apart from the ageing of the beat radios and base stations (repeaters), which results in increasing breakdowns, the maintenance costs for the Beat Radio System are rising. In addition, as the technology currently used in CC II is proprietary to a particular vendor and the manufacturer discontinued production of the current beat radio in 1997, HKPF has encountered increasing difficulty in obtaining spare parts for the Beat Radio System. The vendor's contractual commitment to supply spare components will expire in 2002. Based on past maintenance records and having regard to the spare parts inventory, HKPF considers that it will be difficult to continue the maintenance of the system beyond 2004.

Operational deficiencies of the Beat Radio System and the 999 Sub-system

6.   With the changes in geographical distribution of the population coupled with a justifiably increasing public expectation in respect of the quality of HKPF's service, CC II can no longer fully meet HKPF's operational requirements. Its main deficiencies are as follows -

    (a)   the current Beat Radio System infrastructure is overloaded and cannot take up signals from additional repeaters, which affects response time if there is a sudden surge of calls;

    (b)   as the analogue technology employed by the Beat Radio System infrastructure has limited frequency bandwidth, it cannot support data and image transmission in support of HKPF operations;

    (c)   the Beat Radio System was designed in the late 1980s and does not provide full radio coverage of all inhabited areas in Hong Kong. Furthermore, the developing new towns of Tin Shui Wai, Ma On Shan and Tseung Kwan O have exhausted the reserve expansion capacity of the System and there are a number of radio black spots in developing areas;

    (d)   the existing 999 Sub-system is connected to the Private Automatic Branch Exchange (PABX) system of the buildings in which the three RCCCs are located. As such any upgrading or enhancement of the existing system has to be conducted in conjunction with the whole existing PABX system, which is both difficult and expensive. Moreover, there is no mechanism available to direct the overspill to other RCCCs when there is a sudden surge of calls to a particular RCCC; and

    (e)   as beat patrol officers and patrol officers deployed to the Traffic Branch, PTU and EU are using their own radio systems, cross-communication is not possible. In joint operations, officers need to carry more than one radio, which is undesirable and cumbersome.

ECACCS - Shortcomings

7.   ECACCS is a text-based system with no graphical user interface (GUI)[1] provided and is not user-friendly. Furthermore, it does not provide Chinese

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[1] A graphical user interface is a graphics-based operating system interface that uses icons, menus and a mouse (to click on the icon or pull down the menus) to manage interaction with the system. It is the front-end (desktop) man-machine interface.

language input capability. Despite this, it continues to meet most operational requirements and its shortcomings are remediable. Unlike the Beat Radio System and the 999 Sub-system, which will reach the end of their useful lives by 2004, ECACCS has no particular shelf life and can be successively enhanced.

Main features and benefits of the proposed system

8.   HKPF has conducted a thorough study of its operational requirements and proposes to replace CC II by a new digital CC III. HKPF funded the system design from internal resources and finalised the preliminary design and operational requirements by the end of 2000. In January 2001, HKPF issued a Request-for-Information (RFI)[2] to the industry and received a total of 42 responses from vendors worldwide, including 28 from local companies. This has enabled the Police to firm up the system design and come to a clear view of the proposed project estimates. The main characteristics of the new system are set out below -

   (a)   the new system will have four main modules, viz. the Beat Radio System; the 999 Sub-system; the Computer-assisted Command and Control System (CACCS 3); and the Mobile Computing Sub-system;

   (b)   the new digital radio infrastructure will be built to open standards[3] and capable of further expansion. Equipment such as beat radios will no longer be proprietary and can be procured from open markets at lower cost. In addition, the new system will allow an incremental approach to development and system enhancement in future, obviating the need for major changes and upgrades, which will be more cost effective;

   (c)   it will provide comprehensive radio coverage, both in terms of cross-communication between front-line officers and areas covered, in support of HKPF operations. The proposed system will facilitate the deployment of police resources and strengthen HKPF's capability to prevent and detect crime;

   (d)   it will have sufficient interference-free high-speed data channels to allow transmission of not only voice but also data and images. Based

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[2]   A Request-for-Information on a proposed project is a non-binding document issued to the industry containing preliminary specifications of the project and seeking indicative costs and confirmation that such a project could be built.

[3]   Until recently, each manufacturer had its own proprietary equipment designs. This has always been to the disadvantage of the customer who has been 'locked into' the original supplier. 'Open standards' denote designs that can be replicated by a number of manufacturers, giving the customer more choices.

on the results of internal trials, mobile data terminals (MDTs), which are mobile computing facilities, will be installed on board Police emergency response vehicles[4] in addition to mobile radios, giving officers dual data and voice communications capability. Beat patrol officers will be provided with beat radios with dual voice and data communication (rather than full mobile computing) capability as well[5];

(e)   its new digitised, encrypted transmission platform will greatly enhance protection against eavesdropping and unauthorised access;

(f)   a Geographical Information System (GIS) (with electronic mapping, plotting of incidents/places of HKPF interest etc.) will be installed to facilitate the plotting of scenes of crimes and incidents on digitised maps in the RCCCs;

(g)   CC III will also employ an Automatic Vehicle Location System (AVLS) which, integrated with the GIS, will enable the RCCCs to keep track of Police emergency response vehicles for rapid deployment to scenes of incidents;

(h)   ECACCS will be migrated to modern hardware to enhance its user-friendliness, and become CACCS 3. With the addition of a GUI on desktop terminals, it will no longer be text-based and users will not be required to input data using fixed command codes and syntax. The ECACCS software will be enhanced to accept Chinese language input; and

(i)   the new 999 Sub-system will enable 999 calls to be routed around the same RCCC (intra-flow) or to the other two RCCCs (inter-flow) automatically if there is a sudden surge of calls in one centre. In addition, the new 999 Sub-system will be built on its own PABX system instead of individual PABX system of each RCCC, and hence future upgrading will be much easier and less expensive.

Improved public service

9.   The proposed system will improve Police services to the public in the following ways -

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[4]   Emergency response vehicles are, in general terms, front-line patrol vehicles which are deployed by radio to emergency situations. They include EU and PTU vehicles, and Traffic patrol cars and motor cycles.

[5]   The new beat radio will be an integrated unit providing voice transmission (both radio and mobile telephone), short data messaging, direct wireless access to selected databases, for example EPONICS and, subject to the maturity of the technology, an inbuilt video camera.

(a)   CC III will allow direct access to various information systems including EPONICS for wanted or missing person checks, VALID for stolen vehicle checks, the Communal Information System for filing crime reports and ROPS[6] for forged ID card checks. Such functionality will greatly improve the utilisation and efficiency of the new communications system and enhance the quality of service provided by HKPF. For example, ID checks will be conducted directly through data transfer from MDTs and beat radios, instead of through RCCC operators as is currently the case. It is expected that the average time required for such a check will be reduced by 10 to 15 seconds. As a result, radio channels and RCCC operators will be freed up for voice communications of higher priority and other urgent tasks;

(b)   with the provision of new MDTs, Police emergency response vehicles will be able to effectively function as reporting centres with members of the public being able to make (and officers being able to "accept") reports on the spot;

(c)   the new 999 Sub-system will provide a speedier response to emergency calls when all lines are engaged by making available a further 10 call takers, in addition to the existing seven in each of the RCCCs; and

(d)   serving as an integrated communications system for beat patrol officers and patrol officers deployed to the Traffic Branch, PTU and EU, the new system will improve communications between front-line officers and facilitate the efficient and effective deployment of resources during emergencies and large-scale operations. In addition, with AVLS and GIS, the Police will be able to keep track of the position of Police emergency response vehicles on electronic maps and direct those in the vicinity to the scene of a crime or incident. This will facilitate more flexible and efficient deployment of resources and faster tactical response to incidents.

FINANCIAL IMPLICATIONS

Non-recurrent cost

10.   It is estimated that the one-time capital cost of the proposed CC III will be $948 million. The following table sets out a breakdown of these costs compared with the estimates in FCR(1999-2000)71 submitted to the Finance Committee in March 2000, while a more detailed breakdown is at Enclosure 1 -

Encl. 1

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6   As now, such interface with ROPS will be strictly limited to checking if a Hong Kong ID card is valid or forged. Other information in the ROPS will not be accessible.

Item	Last year's submission $ million	This year's submission $ million
(a) Command control and network management sub-system	100.00	192.00
(b) Radio base stations sub-system	74.00	105.00
(c) Backbone radio relay sub-system	30.00	43.76
(d) Subscriber radios with encryption	360.00	240.00
(e) 999 Sub-system	15.00	15.00
(f) AVLS and GIS	66.50	52.75
(g) CACCS 3	78.00	64.84
(h) Mobile computing sub-system	68.50	35.45
(i) Project management	48.35	42.22
(j) Supporting services (include site preparation, installation, training and documentation)	44.00	77.10
(k) Maintenance, test equipment and spares for the system development phase	58.00	40.90
(l) Radio spectrum licence fees and tariffs for leased line rental	15.00	20.00
(m) Contingency	20.65	19.47
Total	**978.00**[7]	**948.49**
Say		**948.00**

11. As regards paragraph 10(a), the estimate of $192 million is for the procurement of digital switches and facilities inside the RCCCs. It comprises a total of three digital switches including Internet protocol routers at three RCCCs (instead of two proposed in last year's submission; the additional switch is to cater for the additional base stations explained in paragraph 14 below); 123 dispatcher terminals and console furniture in the Headquarters Command and Control Centre (HQ CCC) and three RCCCs; nine central voice loggers (recorders) at three RCCCs; wall displays for mobile data and remote status monitoring of equipment

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[7] $10 million consultancy study fee deducted from last year's total estimate of $988 million.

at hilltop sites and key locations in three RCCCs; uninterruptible power supplies (UPS); and a radio network management system and terminals. The additional $92 million is mainly accounted for by the need for an additional switch and the more complex implementation of a three-switch triangular configuration, including backup facilities, as compared with a two-switch line implementation.

12.   As regards paragraph 10(b), the estimate of $105 million is for the procurement of digital radio base stations and antenna equipment to be installed at hilltop sites and on the rooftops of buildings. It comprises a total of 260 base stations grouped into 120 cell sites ($102 million) (instead of 80 sites in last year's submission); and battery power supplies for each cell site ($3 million). The urban areas of the harbour basin will have 20 cell sites with three base stations per site while the remaining 100 cell sites will each need two base stations. The $31 million increase over last year's submission is mainly attributable to the purchase of additional digital base stations and antenna equipment to cater for the additional cell sites.

13.   As regards paragraph 10(c), the estimate of $43.76 million is for the procurement of three 7.5 GHz digital microwave main loops including hot-standby/diversity radios connecting the hilltop sites, rooftop sites and HQ CCC/RCCCs; 20 to 25 spur links inter-connecting the main loops and the District Operation Rooms. The sub-system will also have the capacity to serve as a dedicated wireless radio back-up for the leased circuits between the RCCCs. The additional $13.76 million is mainly accounted for by the need for extra spur links brought about by the additional cell sites.

14.   Items set out in paragraph 10(a), (b) and (c), which are inter-related and may be collectively referred to as the radio infrastructure, have now been costed at significantly more than last year's estimates. The reason for the increase is that the original costing was based on a handheld radio having a power of three watts. This standard for digital trunked TETRA[8] radio systems has recently been superseded worldwide in favour of a power of one watt, i.e. one-third of the original. During the RFI exercise, all the responding vendors confirmed this[9]. The new standard necessitates a major resizing of the proposed infrastructure and more cell sites.

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[8]   TETRA stands for **TE**rrestrial **T**runked **RA**dio. It is an open digital trunked radio standard developed by the European Telecommunication Standards Institute.

[9]   There are, in fact, very good reasons for one-watt radio. Lower power means less energy costs and less opportunity for eavesdropping, amongst other things.

15.   As regards paragraph 10(d), the estimate of $240 million is for the procurement of 9 250 encrypted handheld beat radios ($200 million); 750 encrypted mobile radios ($20 million); handheld beat radio accessories including batteries, chargers and battery condition testers ($18.5 million); and mobile radio ancillaries ($1.5 million). The current estimate represents a significant saving compared with last year's figure. This is due to a reduction in the number of radios and in unit costs (handheld radios reduced from 10 500 to 9 250, unit cost reduced from $29,000 to $22,000; mobile radios reduced from 1 500 to 750, unit cost reduced from $30,000 to $27,000). We have reduced handhelds by reducing spare inventory, which is possible because the new handhelds will be more reliable and therefore will have fewer breakdowns. The reduction in mobile radios represents a change in policy whereby, generally, only emergency response vehicles will be equipped with radio.

16.   As regards paragraph 10(e), the estimate of $15 million is for the procurement of a new 999 Sub-system to handle emergency calls. The Sub-system includes a 999 PABX and console cluster for seven call taker/supervisor positions with computer-telephony integration servers at each RCCC; ten additional call taker positions for each RCCC for overflow calls from 999 console clusters; facilities to redirect 999 calls to other console operators within the same RCCC (intra-flow) and from one RCCC to another designated RCCC (inter-flow); a 999 network management system; three UPS for the PABX at three RCCCs; an interface gateway with CACCS 3; and equipment installation, factory acceptance, training and documentation.

17.   As regards paragraph 10(f), the estimate of $52.75 million is for the procurement of equipment including 500 AVLS receivers for Police emergency response vehicles, including installation ($13.75 million), four sets of AVLS and GIS hardware and software for HQ CCC and three RCCCs ($35 million); and four high-speed Local Area Networks (LAN) for handling AVLS and GIS data traffic in HQ CCC and three RCCCs ($4 million). Because of the need for a more sophisticated AVLS model, the unit cost of the AVLS receivers has significantly increased from $5,000 to $27,500. It was thought last year that relatively simple AVLS equipment would suffice but it is clear now, that having regard to Hong Kong's topography, notably building height and density, only sophisticated equipment could provide the required accuracy. In addition, very rigorous testing of the facility will be needed before implementation. Overall, however, the current estimate is significantly lower than last year's submission. This is due largely to the decision to use CACCS 3 desktop terminals for the display of GIS data after critical re-evaluation and therefore the 100 GIS terminals included in last year's submission are no longer required.

18.   As regards paragraph 10(g), the estimate of $64.84 million is for the upgrading of ECACCS ($37 million) by migrating it to modern backend hardware (servers); the addition of a GUI and Chinese language input capability; interfaces with other systems such as EPONICS; and 290 new console workstations ($27.84 million). The estimate of $78 million in last year's submission was based on the complete replacement of ECACCS, given our belief at that time that a new system built to open standards would not be significantly more expensive, indeed possibly cheaper. The RFI exercise, however, indicated otherwise[10].

19.   As regards paragraph 10(h), the estimate of $35.45 million is for the provision of 270 ruggedised MDTs for emergency response vehicles and installation ($16.47 million); 'client' software for the MDTs ($4.05 million); GIS software licences for the MDTs ($5.13 million); and hardware and software for the wireless LAN gateway, firewall and application servers ($9.8 million). The considerable reduction over last year's estimates is due to a reduction in the number of MDTs required. We originally thought that all Police patrol vehicles should be supplied with MDTs. On critical reflection, however, the business case for supplying MDTs to all Police patrol vehicles is not sufficiently strong. We now propose that emergency response vehicles, which have the dual role of functioning as mobile command centres at the scenes of serious incidents, will be equipped with MDTs.

20.   As regards paragraph 10(i), the estimate of $42.22 million is for the employment of contract staff including 54 man-months of Contract Senior Telecommunications Engineer, 282 man-months of Contract Telecommunications Engineer, 52 man-months of Contract Senior Project Manager, 104 man-months of Contract Project Manager, 156 man-months of Contract Systems Analyst and 132 man-months of Contract Analyst Programmer for the implementation of the new communications system[11]. The present estimate is less than last year's because we have already completed system design and have changed the requirements of the project.

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[10] In addition, it is now evident that, in any event, open computer-aided dispatch systems (which are what ECACCS is) cannot match proprietary ones in terms of performance, without prohibitive expenditure. ECACCS software has no particular shelf life and it is considered that an upgrade along the lines described is the appropriate way ahead. By adopting this approach the recurrent costs will be limited to $25.7 million whereas the RFI exercise indicated that an open standards system replacement would attract recurrent costs as high as $41.2 million.

[11] Flexible deployment of both in-house staff and contract staff will be adopted to facilitate smooth implementation of the project.

21.   As regards paragraph 10(j), the estimate of $77.1 million is for supporting services such as equipment installation in respect of items set out in paragraph 10(a) to (c) ($33.6 million); site preparation and development for 120 cell sites and RCCCs ($16.6 million); training and documentation ($8.4 million); tender evaluation and factory acceptance test ($0.5 million); and AVLS and GIS implementation ($18 million). The increase in the current estimate over last year's submission is attributable to two main factors: firstly, the major resizing of the infrastructure required, to take account of the new one-watt radio; and secondly, a relatively sophisticated system will be required for AVLS to perform to an acceptable standard in Hong Kong[12]. AVLS supported by GIS is considered essential to the operational effectiveness of the Force.

22.   As regards paragraph 10(k), the estimate of $40.9 million is for provision of modular and field replaceable units, consumable spare components, special-to-type test equipment and general test equipment. The figure has been calculated on the basis of about 7% of the cost items set out in paragraph 10(a) to (e) and is based on our experience with CC II.

23.   As regards paragraph 10(l), the estimate of $20 million is for the radio spectrum licence fees and tariffs for leased line rentals from the public network operators during the system development phase. It comprises radio spectrum fees for base station and backbone radio relay frequencies and subscriber radio licence fees ($4 million), leased lines installation ($0.5 million), and annual tariffs for leased lines connecting the RCCCs, cell sites and the 999 Sub-system ($15.5 million). The increase over last year's estimate is attributable to the increase in cell sites and hence, a corresponding increase in these charges.

24.   As regards paragraph 10(m), the estimate of $19.47 million represents a contingency of about 2.6% on the cost items set out in paragraph 10(a) to (h).

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[12] Responses to the RFI indicated that due to Hong Kong's topography (building height and density), Global Positioning System (GPS) technology alone will not provide the required coverage and accuracy. Hence, more sophisticated location technology, including 'dead reckoning' devices and map-matching, is needed. 'Dead-reckoning' and map-matching are technologies that improve position accuracy when GPS is temporarily beyond reach of the patrol vehicle. The former feeds information concerning the speed and direction of the vehicle into the GPS receiver to enable it to continue calculating the vehicle's current position (in the absence of GPS data). The latter takes the 'dead reckoning' data and "matches" it to the road information in the GIS to determine which road the vehicle is driving along. In the absence of this corrective process, vehicles would appear on the GIS display in ludicrous and confusing locations, e.g. the tops of buildings. The two technologies require complex calculations and sophisticated mathematical modelling to implement. Implementation is technically difficult and calls for very careful integration of the component parts of the system and rigorous testing. The implementation costs are therefore significant.

25.   The estimated cash flow will be as follows -

Year	$ million
2001-02	3.36
2002-03	228.18
2003-04	265.62
2004-05	219.34
2005-06	145.22
2006-07	86.28
Total	948.00

26.   At the time of the first submission, Members queried the apparent high cost of a handheld beat radio and a MDT compared to a domestic mobile telephone and a notebook computer, respectively. An analysis of this issue is at Encl. 2   Enclosure 2.

Recurrent cost

27.   The estimated annual recurrent costs of the project will be $59.49 million, which compares with last year's estimate of $56.75 million. Compared with the recurrent cost of CC II, which is $52 million, the estimated additional annual recurrent expenditure arising from the proposed system is $7.49 million. The following is a breakdown -

Item	Last year's submission $ million	This year's submission $ million
(a) Recurrent cost of the proposed system		
(i) computer hardware and software maintenance	27.62	23.84
(ii) communication system maintenance and spare parts	14.50	14.30
(iii) leased-line rental fees	10.63	17.35
(iv) radio spectrum licence fees	4.00	4.00
Sub-total	56.75	59.49
Less		
(b) Recurrent cost of the existing system		(52.00)
Total		**7.49**

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28.　　　　As regards paragraph 27(a)(i), the estimate of $23.84 million is for the hardware and software maintenance of CACCS 3, AVLS GIS, and the Mobile Computing Sub-system.

29.　　　　As regards paragraph 27(a)(ii), the estimate of $14.3 million is for annual maintenance support for the proposed communications systems, i.e. the Beat Radio System and the 999 Sub-system.

30.　　　　As regards paragraph 27(a)(iii), the estimate of $17.35 million is for rental of high-speed data lines that will connect the RCCCs with the hilltop and rooftop sites. The increase of $6.72 million over last year's submission is accounted for by the necessary increase in such sites.

31.　　　　As regards paragraph 27(a)(iv), the estimate of $4 million is for radio spectrum licence fees.

32.　　　　As regards paragraph 27(b), this is the annual overall recurrent cost of CC II.

33.　　　　CC III will be supported by existing manpower in RCCCs and local Police stations. Therefore, no additional recurrent resources will be required in this regard.

IMPLEMENTATION PLAN

34.　　　　HKPF plans to implement the proposed system according to the following schedule -

Activity	Target dates
(a) Tendering and award of contract	August 2001 to April 2002
(b) Delivery of equipment, installation, acceptance tests and training	May 2002 to December 2003
(c) System commissioning and phased roll-out	January 2004 to August 2005

/**OTHER** …..

OTHER PROPOSALS CONSIDERED

35.   In addition to upgrading ECACCS, HKPF has also considered the feasibility of upgrading the other component parts of the system rather than replacing them. Unlike ECACCS, however, these other components have a definite shelf life and will reach the end of it by 2004. Moreover, the continued maintenance of an obsolescent analogue infrastructure is not cost effective. It is considered important that HKPF now embrace the latest digital technology, as other modern police forces are starting to do.

CONSULTATION WITH LEGISLATIVE COUNCIL PANEL

36.   We consulted the Legislative Council Panel on Security on the proposal on 7 June 2001. Members raised no objections.

BACKGROUND INFORMATION

37.   This proposal to replace CC II of the Operations Department of HKPF was last discussed by the Finance Committee on 10 March 2000 vide FCR(1999-2000)71.   Members suggested that the Administration consider implementing the proposal in two phases, viz. system design and system procurement, so as to leverage continuing technology advancement. Accordingly, Phase I has been completed with HKPF's resources. Preliminary design and operational (users') requirements were finalised by the end of 2000. In January 2001, an RFI exercise was conducted to enable the Administration to firm up the system design and come to a clear view of the proposed project estimates. This revised funding proposal for implementation of CC III is submitted for approval to enable its timely implementation before the existing Beat Radio System and the 999 Sub-system reach the end of their useful lives.

Security Bureau
June 2001

Non-recurrent Cost of CC III

Item	Last year's submission $ million	This year's submission $ million	Remarks
(a) Command control and network management sub-system - 3 digital switches - RCCC (voice logger, console equipment etc.) - Network management system **Sub-total:**	 **100.00**	 140.00 37.00 15.00 **192.00**	
(b) Radio base stations sub-system - 260 base stations - Battery power supply system for each base station **Sub-total:**	 **74.00**	 102.00 3.00 **105.00**	) Number of sites) increased from 80 to 120
(c) Backbone radio relay sub-system Radio transport system **Sub-total:**	 **30.00**	 **43.76**	Using 7.5GHz compared to 15GHz last year
(d) Subscriber radios with encryption - 9 250 handheld radios - 750 mobile radios - Handheld radio accessories - Mobile radio accessories **Sub-total:**	 **360.00**	 200.00 20.00 18.50 1.50 **240.00**	 No. of handheld radios reduced from 10 500 to 9 250 No. of mobile radios reduced from 1 500 to 750
(e) 999 Sub-system **Sub-total:**	**15.00**	**15.00**	
(f) AVLS and GIS - 500 AVLS receivers including installation - 4 sets of AVLS and GIS hardware and software for HQ CCC and 3 RCCCs - 4 high-speed LANS for HQ CCC and 3 RCCCs **Sub-total:**	 **66.50**	 13.75 35.00 4.00 **52.75**	
(g) CACCS 3 - Interfaces with other systems - 290 new console workstations **Sub-total:**	 **78.00**	 37.00 27.84 **64.84**	
(h) Mobile computing sub-system - 270 MDTs including installation - 270 sets of 'client' software - 270 GIS software licences - Hardware and software for the wireless LAN gateway, and firewall and application servers **Sub-total:**	 **68.50**	 16.47 4.05 5.13 9.80 **35.45**	

Item	Last year's submission $ (m)	This year's submission $ (m)	Remarks
(i) Project management			
- Communications Branch	22.39	18.22	54 man-months of Contract Senior Telecommunications Engineer and 282 man-months of Contract Telecommunications Engineer
- Information Technology Branch	25.96	24.00	52 man-months of Contract Senior Project Manager, 104 man-months of Contract Project Manager, 156 man-months of Contract Systems Analyst and 132 man-months of Contract Analyst Programmer
Sub-total:	**48.35**	**42.22**	
(j) Supporting services (include site preparation, installation, training and documentation)			
- Implementation services for (a) to (c)		33.60	
- Base station development		16.60	
- Training and documentation		8.40	
- Tender evaluation and factory acceptance tests		0.50	
- AVLS and GIS implementation		18.00	
Sub-total:	**44.00**	**77.10**	
(k) Maintenance, test equipment and spares for the system development phase			
- Maintenance Management System		11.32	
- Test equipment for (a) to (d)		8.28	
- Maintenance spares for (a) to (d)		21.20	
- Spares and test equipment for (e)		0.10	
Sub-total:	**58.00**	**40.90**	
(l) Radio spectrum licence fees and tariffs for leased line rentals			
- Spectrum licences for (b) and (c)		4.00	)
- Leased line installation for (a) to (c)		0.45	) Increase in leased line
- Leased line tariffs (system development phase) for (a) to (c)		10.80	) rental charges due to
- Leased line installation for (e)		0.05	) additional base stations
- Leased line tariffs (system development phase) for (e)		4.70	)
Sub-total:	**15.00**	**20.00**	
(m) Contingency **Sub-total :**	**20.65**	**19.47**	
Total:	**978.00**	**948.49**	

A comparative analysis of a CC III handheld radio/mobile data terminal and a domestic mobile telephone/laptop computer

Serial No.	Major feature	CC III beat radio	Domestic mobile telephone	Mobile data terminal	Networked laptop computer
1.	Ruggedised	Yes	No	Yes	No
2.	Shower/heat/humidity proof	Yes	Not to anything like the same extent	Yes	No
3.	Shock proof	Yes	Not to anything like the same extent	Yes	No
4.	High resilience – communications maintained during exceptionally heavy traffic	Yes	No	Yes	No
5.	End-to-end encryption	Yes	No	Yes	Not normally
6.	Extremely fast call set-up time; 0.5 seconds	Yes	No	Yes	No
7.	Emergency 'officer needs assistance' function	Yes	No	N/A	N/A
8.	Backend database and conversion checking	Yes	No	Yes	Yes
9.	Dynamic regrouping of talk-group members	Yes	No	N/A	N/A
10.	Group call to all members of a talk-group	Yes	No	Yes (e-mail)	Yes (e-mail)
11.	Broadcast call to all members of multiple talk-groups	Yes	No	Yes (e-mail)	Yes (e-mail)
12.	Broadcast call to all members of all talk groups	Yes	No	Yes (e-mail)	Yes (e-mail)
13.	Cell-phone capability	Yes	Yes	N/A	'Internet voice' but poor quality
14.	Remote monitoring of the handheld unit even in 'idle' mode	Yes	No	Yes	No
15.	Remote (over the air) disablement of the handheld unit if lost or stolen	Yes	No	Yes	No
16.	Hot-mike capability	Yes	No	N/A	N/A
17.	A mission-critical piece of equipment	Yes	No	Yes	No
18.	Customised	Yes	Some settings customisable	Yes	Some settings customisable
19.	Radio capability	Yes	No	N/A	N/A

Notes

1. Whilst a beat radio and a mobile telephone permit a reasonable comparison, such is more difficult with a MDT and a laptop computer. With the laptop computer, we have assumed the situation whereby its owner has connected to his/her organisation's LAN/intranet via the Internet.

2. The relatively large numbers of manufacturers and the huge production volumes of domestic mobile phones serve to continually increase competition and drive down prices. With public safety handheld units, the special-to-type features and functionality required make research and development costs high. It follows that relatively few manufacturers can accommodate such. Furthermore, the market for such equipment is of a limited volume, probably not much more than ten million handheld units, for example worldwide. Nevertheless, manufacturers are entitled to expect a reasonable return on their research and development investment.

3. However, the advent of open standards, i.e. the ability to source equipment from more than one manufacturer, has improved competition and, generally, is a "win-win" situation for both customers and manufacturers. Customers get lower prices. Manufacturers are able to bid for 'add-ons' to existing systems, which they would not be able to do if the systems were proprietary.