ITEM FOR FINANCE COMMITTEE

CAPITAL WORKS RESERVE FUND
HEAD 710 - COMPUTERISATION
Registration and Electoral Office
New Subhead "Development of a New Electoral and Registration System"

> Members are invited to approve a new commitment of $62.50 million for development of a new Electoral And Registration System to support the registration of electors and the electoral arrangements by the Registration and Electoral Office.

PROBLEM

The existing Electoral And Registration System (EARS) has been in use for almost 10 years. Its limited capacity and functions can hardly cope with the requirements of future elections.

PROPOSAL

2.   The Chief Electoral Officer, on the advice of the Director of Information Technology Services and with the support of the Secretary for Constitutional Affairs and the Electoral Affairs Commission (EAC), proposes to develop a new EARS to replace the existing one to improve operational efficiency and effectiveness.

/**JUSTIFICATION** .....

JUSTIFICATION

Existing EARS

3.   The existing EARS is a mainframe computer system developed in 1993. It maintains the electoral records of some three million Legislative Council (LegCo) Geographical Constituency and District Council (DC) Constituency electors, 180,000 Functional Constituency (FC) electors and subsector voters, 800 Election Committee members, as well as information on the membership of umbrella organisations for updating the FC and subsector registers. The system also prints annual electoral registers, poll cards, mailing labels and election notices.

4.   The EARS underwent three major enhancements in 1994-95, 1997-98 and 1999-2000 to expand its functionality to meet the specific needs of major elections. However, due to the constraints of the system and the need to complete enhancements within limited time, the computer applications subsequently added to the system were not fully integrated. As a result, these applications have to be run on standalone computers, leading to maintenance of multiple databases and inefficient information flow among different systems. The existing mainframe architecture also limits options available to the Registration and Electoral Office (REO) in capitalising on new technologies to automate the manual workflows in processing voter registration applications and re-allocating voters to different constituencies if and when constituency boundaries are changed. These two major electoral tasks are currently performed in a very labour-intensive manner. During the annual voter registration drives, a large number of temporary staff have to be engaged in processing voter registration applications and entering voters' records into the EARS. Likewise, a lot of manual efforts are involved in re-allocating voters to different constituencies if and when constituency boundaries are changed.

5.   In addition, the capacity of the existing EARS is reaching its limit. The electorate size, however, is expected to continue to increase. Apart from storage difficulties, the system has constraints in terms of its capability to perform data matching with other government departments. At present, the REO matches its data with Immigration Department and Housing Department, for the purpose of updating voters' residential addresses on the electoral rolls. We plan to extend this arrangement to other departments, but the existing EARS will not be able to cope with new demands arising from such extension. Furthermore, as the existing EARS is not fully bilingual, REO staff have to do the English translation before data entry if the voter registration forms are completed in Chinese. This hampers efficiency and accuracy of data input. Finally, given the old system design, the existing EARS has become increasingly difficult and expensive to maintain.

/**Development** .....

Development of a new EARS

6.	In 2000, the REO commissioned a feasibility study on a new EARS. Based on the recommendations made by the consultant upon the completion of the study in July 2001, we propose a new system with the following main features -

(a)	a comprehensive database on electoral records of voters and other information on election;

(b)	sufficient capacity to handle future growth in the number of electors;

(c)	automation of existing manual workflows (including processing of voter registration applications, re-allocating voters to different constituencies and assignment of voters to polling stations);

(d)	a fully bilingual system for storage of electoral records and printing of poll cards;

(e)	storage of election expenses and relevant information on electoral arrangements; and

(f)	a uniform interface with other government computer systems (including the Electronic Service Delivery (ESD) system).

Anticipated Benefits

7.	The new EARS will bring about the following service improvements -

(a)	the new system incorporates new functionality which is currently performed on separate standalone computers. Relevant data and information can now be stored in the new EARS more systematically. This will enable the REO to perform its electoral functions more efficiently and effectively. It will also make it easier for subsequent system back-ups and administration;

(b)	the expanded capacity for electoral records to be stored in both English and Chinese will enable the REO to handle the future growth in the electorate size effectively. Apart from improving the accuracy of electors' records, the bilingual facilities will also offer the flexibility for electors' records to be presented on the voter registers in either English or Chinese according to the preference of the electors;

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(c)   the proposed EARS will have a new sub-system, namely the document management system (DMS). With the DMS and the integration of the address hinterland list, the processing of voter registration applications will be streamlined, thereby improving operational effectiveness, with faster processing time and reduced error rates;

(d)   another sub-system to be incorporated is the geographical information system (GIS). It will automate the re-allocation of electors if and when constituency boundaries are changed. It can provide better support services for the EAC in drawing up constituency boundaries, as the system can easily and speedily generate a wide range of options for consideration by the EAC. This will enable EAC to conduct the delineation exercise in a more efficient manner;

(e)   the use of a highly scalable architecture and a modular approach in the design of the new EARS will offer the greatest flexibility for further enhancement and expansion. This will increase the capability of the proposed EARS to cater for new requirements that will arise from an evolving electoral system;

(f)   the proposed uniform interface with the ESD will further streamline the processing of electronic voter registration applications received through the ESD system. It will also enable the REO to extend the existing data matching arrangements to other government departments, thereby improving the updatedness of the electoral rolls;

(g)   the REO will be able to provide a year-round service for voters to check their records on the voter registers through terminals set up in District Offices. It can also be more responsive to voters' enquiries relating to their electoral records; and

(h)   the proposed EARS will incorporate all relevant information required for future planning. This can, for example, facilitate the REO in compiling budget estimates and putting in place the necessary practical arrangements for future elections.

Cost-benefit Analysis

8.   The non-recurrent and recurrent costs to be incurred for the new EARS between 2001-02 and 2013-14 are $175.78 million. We estimate that the proposed EARS will achieve a total saving of $148.92 million during the same period. The amount of savings will vary annually, depending on whether a general election will be held in the year or not. On average, there will be annual realisable

savings of $2.15 million (starting from 2003-04) and notional savings of $12.53 million (starting from 2004-05). The breakdown is as follows -

			$ million	$ million
(a)	**Realisable savings**			
	(i)	hardware and software maintenance of existing EARS	0.39	
	(ii)	Information Technology and Services Department (ITSD) staff and contract staff for maintaining existing EARS	1.76	
		Sub-total		2.15
(b)	**Notional savings**			
	(i)	avoidance of costs for additional staff for processing voter registration applications	6.67	
	(ii)	avoidance of costs for additional staff due to improved automation in delineation of constituencies and re-allocation of voters	2.30	
	(iii)	avoidance of costs for additional staff due to automated production of polling station location maps	0.22	
	(iv)	reduced cost for system enhancements	1.28	
	(v)	reduced data transfer efforts from EARS to sub-systems	0.07	
	(vi)	avoidance of apportioned cost of ITSD Central Computer System	1.99	
		Sub-total		<u>12.53</u>
		Total savings		<u>14.68</u>

Encl.   A cost-benefit analysis for the new EARS is at Enclosure.

FINANCIAL IMPLICATIONS

Non-recurrent Expenditure

9.   The estimated non-recurrent cost of the new system is $66.42 million, made up of a non-recurrent expenditure of $62.50 million and a non-recurrent staff cost of $3.92 million. The breakdown is as follows -

		2001-02 **$ million**	**2002-03** **$ million**	**2003-04** **$ million**	**Total** **$ million**
(a)	Hardware and software	-	10.94	9.30	20.24
(b)	Site preparation	-	0.54	3.65	4.19
(c)	Professional service	-	1.53	3.27	4.80
(d)	Contract staff service	0.24	7.88	19.47	27.59
(e)	Contingency	0.02	2.09	3.57	5.68
	Sub-total	**0.26**	**22.98**	**39.26**	**62.50**
(f)	REO staff costs	-	1.96	1.96	3.92
	Sub-total	**-**	**1.96**	**1.96**	**3.92**
	Total	**0.26**	**24.94**	**41.22**	**66.42**

10.   As regards paragraph 9(a) above, the expenditure of $20.24 million is for acquisition of computer hardware and software for setting up the new system. The hardware will include various servers, workstations, scanners, printers, communications and network equipment, etc. The software will include operating systems, database management systems, application development tools, etc.

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11.   As regards paragraph 9(b) above, the expenditure of $4.19 million is for setting up the equipment room and local area network at the data centre and REO offices.

12.   As regards paragraph 9(c) above, the expenditure of $4.8 million is for hiring of services for equipment installation, system configuration, system customization and staff training.

13.   As regards paragraph 9(d) above, the expenditure of $27.59 million is for hiring of contract staff and services for the development and implementation of the system.

14.   As regards paragraph 9(e) above, the estimated cost of $5.68 million represents 10% contingency on the cost items set out in paragraphs 9(a) to (d) above.

15.   As regards paragraph 9(f) above, the expenditure of $3.92 million is for the creation of two time-limited posts, comprising one Senior Executive Officer and one Executive Officer I, from 2002-03 to 2003-04. These two officers will be responsible for co-ordinating the user requirements and supporting the development of the new EARS.

Recurrent Expenditure

16.   The annual recurrent expenditure for the on-going maintenance and support for the system is estimated at $5.86 million for 2003-04 and $10.35 million for 2004-05 and onwards, with breakdown as follows -

		2003-04 **$ million**	**2004-05 and** **onwards** **$ million**
(a)	Hardware and software	3.18	3.26
(b)	Consumables	0.36	0.87
(c)	Support service	0.67	1.61
(d)	Professional service	-	0.65
(e)	Contract staff service	1.38	3.30
(f)	Miscellaneous	<u>0.27</u>	<u>0.66</u>
	Total	**<u>5.86</u>**	**<u>10.35</u>**

17.　　　　As regards paragraph 16(a) above, the annual expenditure of $3.26 million represents the maintenance cost of the hardware and software of the system.

18.　　　　As regards paragraph 16(b) above, the annual expenditure of $0.87 million is for purchase of consumables including printer supplies, paper, recordable CDs, uninterrupted power supply batteries and tape cartridges.

19.　　　　As regards paragraph 16(c) above, the annual expenditure of $1.61 million is for hiring of services provided by contract operators to support the operation of equipment at the data centre and REO offices.

20.　　　　As regards paragraph 16(d) above, the annual expenditure of $0.65 million is for hiring of maintenance services for two sub-systems (the GIS and DMS) and the hiring of training services for operational staff.

21.　　　　As regards paragraph 16(e) above, the annual expenditure of $3.30 million is for hiring of contract services regarding the maintenance and minor enhancement of the system.

22.　　　　As regards paragraph 16(f) above, the annual expenditure of $0.66 million is for miscellaneous expenses, including power consumption.

23.　　　　The estimated annual recurrent cost for maintaining the new system is $10.35 million.　As compared with the present full year recurrent cost of $2.27 million for maintaining the existing EARS, we will require an additional recurrent expenditure of $8.08 million from 2004-05 onwards for the new system. The manpower requirement of REO in supporting the day-to-day operations of the new EARS will be absorbed within existing resources.

IMPLEMENTATION

24.　　　　We aim to implement the system in time for the 2004 LegCo elections. A tentative implementation timetable is as follows -

/**Milestone** .....

Milestone Activities	**Expected Completion Date**
(a) System analysis and design	November 2002
(b) System implementation	October 2003
(c) System live run	November 2003
(d) System being used for preparation of the 2004 LegCo elections	Early 2004

BACKGROUND INFORMATION

25.		In 1993, Members approved the replacement of a computer system to provide better support for registration of electors with a total non-recurrent cost of $30.51 million.

26.		In 1997, Members approved the creation of a new subhead with a commitment of $21.63 million for enhancing the computerised EARS to cope with the new electoral arrangements for the first LegCo election of the Hong Kong Special Administrative Region.

27.		In April 1999, Members approved a new commitment of $25.52 million for enhancing the EARS to provide adequate support for the first DC election and the second LegCo election.

28.		In 2000, the REO commissioned a consultant to undertake a feasibility study to look into the technical feasibility and financial implications of developing a new EARS. Before arriving at the recommendation outlined in the above paragraphs, the consultant has in fact considered two other options, namely -

>	(a)	to enhance the existing EARS on the mainframe; and

>	(b)	to customize an off-the-shelf voter registration package.

29.		Both options, however, are deemed to be not feasible. Option (a) requires the addition of a mid-range system to the mainframe, and the mixture of the two will create a complex architecture which is more difficult to maintain and change to meet future requirements and changing needs. Option (b) has the benefit of reduced risk, development costs and time, but the package would still require very significant customization to meet our requirements of supporting storage and display of Chinese characters. The non-recurrent and recurrent costs of these two options are also higher than that of the recommended one.

30.   The LegCo Panel of Constitutional Affairs discussed the proposal of developing a new EARS in its meeting on 17 December 2001. Members have no objection to the proposal.

Constitutional Affairs Bureau
Januaray 2002

Cost and Benefit Analysis of the Proposed Electoral and Registration System
(At 2001-02 Price Level)

YEAR	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	Total
	($ million)													
COST														
Non-recurrent Expenditure (a)	0.26	24.94	41.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	66.42
Recurrent Expenditure (b)	0.00	0.00	5.86	10.35	10.35	10.35	10.35	10.35	10.35	10.35	10.35	10.35	10.35	109.36
Total cost (c)=(a)+(b)	0.26	24.94	47.08	10.35	10.35	10.35	10.35	10.35	10.35	10.35	10.35	10.35	10.35	175.78
SAVINGS														
Realisable Savings (d)	0.00	0.00	0.95	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	2.27	23.65
Notional Savings (e)	0.00	0.00	0.00	12.20	6.85	7.46	25.53	10.71	8.76	8.76	25.53	10.71	8.76	125.27
Total Savings (f)=(d)+(e)	0.00	0.00	0.95	14.47	9.12	9.73	27.80	12.98	11.03	11.03	27.80	12.98	11.03	148.92
Net Savings (f)-(c)	-0.26	-24.94	-46.13	4.12	-1.23	-0.62	17.45	2.63	0.68	0.68	17.45	2.63	0.68	-26.86
Net Present Value (Note)	-0.26	-23.98	-42.65	3.66	-1.05	-0.51	13.79	2.00	0.50	0.48	11.79	1.71	0.42	-34.10
Net Cumulative Savings (Note)	-0.26	-24.24	-66.89	-63.23	-64.28	-64.79	-51.00	-49.00	-48.50	-48.02	-36.23	-34.52	-34.10	NA

Note : A discount rate of 4% is adopted for the financial appraisal of a computer project where the cashflow is expressed at constant prices.