For Discussion on
12 January 2007

Legislative Council Panel on Home Affairs
Replacement of the Library Automation System
for the Hong Kong Public Libraries

Purpose

This paper seeks Members' support for a proposed project to replace the Library Automation System of the Hong Kong Public Libraries (HKPL) with a new system and to launch a pilot run of an add-on Radio Frequency Identification (RFID) sub-system.

Background

2. The Library Automation System (LAS), being an integrated multi-function system, was first launched in 1993. It brought the public library services in Hong Kong into a new era of automated services.

3. The LAS is now an integral part of the daily operation of the HKPL network comprising 66 static libraries and ten mobile libraries. It not only caters for core library functions, such as patron registration, library material acquisition, cataloguing and circulation, inter-library loan and the return of borrowed items to any library in the system, it also makes 24-hour library services on the Internet possible. Commensurate with the increasing demand and expectations from the public in recent years, the LAS has enabled efficient lending services by providing online searching of library catalogues, reservation of books, renewal of library materials borrowed as well as telephone renewal services for borrowed library items.

4. The LAS is one of the largest bilingual computerised library systems in the world with full Chinese and English capability. It currently carries bibliographical records for a library stock of over 10 million and 3.4 million registered patron records. It has the highest transaction volume of

lending and renewal records amounting to over 61 million per annum. With the availability and growing popularity of 24-hour online public library services of the LAS, the transaction volume is expected to continue to grow rapidly in the coming years.

5. Despite a number of upgrading and enhancements in the past 13 years, the fast advancement in information technology (IT) in the past decade has made a number of key components of the system, including the core library applications, obsolete. To cope with the projected increase in transaction volume demand in the coming years and further expansion and enhancement of library services to ensure sustainable development of library services in the 21st century, the existing system needs to be replaced in a timely and well-planned manner such that the services provided to the public will not be adversely affected.

The Feasibility Study and its Recommendations

6. In view of the above considerations, Leisure and Cultural Services Department (LCSD) commissioned an external consultant to carry out a feasibility study (FS) in late 2005 with the objective of verifying the need for replacing the existing LAS. The opportunity was also taken to explore the feasibility of deploying the application of the add-on RFID sub-system to the LAS.

7. The results of the FS indicated the need to replace the existing LAS with a new system since it is incapable of meeting future demands. As replacement of the new system will require a few years to complete, it is important to start the work now. The FS also recommended that, in line with the worldwide trend of self-service and use of RFID technology in libraries, a pilot study in the use of RFID should be carried out in parallel in order to provide a more user-friendly environment for self-service to develop in public libraries.

(A) LAS Replacement

Constraints of the Existing LAS

8. Currently, HKPL is facing imminent critical system problems and limitations of the existing LAS, such as :

(a) a number of system components have reached the end of their life cycle and no enhancement in capacity and functions in coping with new requirement from the public is feasible;

(b) the core library application development has been ceased as the system vendor has chosen to spend their resources on another new platform of library solutions. Even though the HKPL has continuously reviewed and upgraded the capacity of LAS in order to meet its business growth, the obsolescent technology has hindered further upgrade of LAS, both in terms of capacity and library functions; and

(c) it is forecast that by 2010, the annual circulation transaction volume will reach 78 million, representing an increase of about 30% when compared with the present level. If the system is not replaced in a timely manner, the efficiency of public library service would be seriously affected.

Proposed LAS Replacement

9. Based on the FS report, the new library system is proposed to be a commercial off-the-shelf (COTS) library package that is based on open standards and best practices of the IT and library industries. Customisation would be applied to the COTS for providing functions to meet HKPL's specific needs, such as accounting and management reports.

10. Other than the existing core library functions, the new library system should include many more new and customer-oriented functions, such as :

(a) virtual reference services sub-system that allows library staff to handle online enquiries more effectively and efficiently with a knowledge base of reference questions and answers with a view to providing high quality digital reference services;

(b) electronic resources management sub-system that allows libraries to manage subscription and access to online information services so that electronic resources such as e-books, online databases, e-journals, etc., could be more effectively and seamlessly provided to library users;

(c) online reservation sub-system that allows public users to enjoy the convenience of online booking for the use of Internet workstations in the public libraries;

(d) electronic services including e-Payments that allow users to enjoy the convenience of payment settled through electronic means such as Octopus and credit cards;

(e) customer relationship management capability that allows library management to identify service gap for further enhancement so as to ensure customer satisfaction; and

(f) management information sub-system that allows library management to capture essential statistics for more effective managerial decision.

11. In addition, the new system is expected to provide the necessary platform for collaboration with local academic libraries, public libraries in the Pearl River Delta Region and libraries overseas.

Anticipated Benefits of the new LAS System

12. With the new system in place, it would certainly bring about the following benefits through the new customer-focused features for the provision of public library services in Hong Kong :

(a) the core library functions would improve customer services such as

through reducing the time required for selection, acquisition and processing of new library materials;

(b) an industry proven library package which builds on open standards would allow easy integration of different technologies and solutions to meet the ever-growing public demands for better services;

(c) more user-friendly, comprehensive and content rich online catalogues, together with a robust searching function, would facilitate users to conduct more effective searches of library collections and information resources in support of their lifelong learning activities;

(d) more electronic services would be provided to the public including different electronic payment methods for settling library fines and charges, such as the use of credit cards or cash cards, etc, which is also in line with the Government's Digital 21 Strategy;

(e) with the virtual reference services sub-system to be provided by the new LAS, the public could benefit from the ease of information pursuit by interacting with the reference librarians online via web forms, emails, or in real-time. The service would be further enhanced by the enriched knowledge base of the new system;

(f) in order to alleviate manpower for the manual handling of requests for reservation of computer workstations, online reservation service for the booking of public computers would also be available to allow the public to reserve library workstations conveniently; and

(g) information on library service usage and the flexibility of the new LAS in integrating different technologies would enable HKPL to provide more customer-focused services. It would speed up the decision making in addressing customer needs and preferences.

Implementation Plan

13. With funding approval from Finance Committee in February 2007, it is expected that the contract for the project implementation will be

awarded in early 2008 upon completion of the tendering process. The target is to have all the core functions of the new system ready by the end of 2009 and the new and enhanced functions available by mid-2011. A tentative implementation schedule is at Annex 1.

(B) RFID Pilot Study

RFID library applications

14. Presently, library items of the HKPL are attached with paper bar-code labels which enable the identification of the items by bar-code readers. The information thus read would facilitate processing by the LAS for cataloguing and circulation services. This bar-code system however has much limitation for further enhancement of the library automation services such as self check-in and check-out and in locating the library materials.

15. The deployment of RFID system, which employs RFID tags to replace the paper bar-code labels, is an evolving innovative concept in the present day library service management. With the progressive advancement in RFID technology, RFID library applications have been gradually deployed in many metropolitan libraries worldwide such as Singapore National Library, Seattle Public Library, etc., and given rise to a breakthrough in the use of a self-service model for library services. Yet there are still some technical limitations on which improvements are anticipated to be made in coming years. In addition, it is also noted that the high cost of RFID applications, as in the price of electronic tags and equipment, has been dropping over the course of time.

16. To study the optimal opportunity for deploying the new technology, the FS recommended an add-on RFID sub-system, which integrates with the new LAS, be deployed in a few selected libraries as a pilot study. The effectiveness of the new technology in bringing about a user-friendly self-service environment for delivering library services will be critically evaluated through the pilot study.

17. In the pilot study, six libraries including two major libraries, two

district libraries and two small libraries would be selected. Major library operations such as self-service environment for lending and returning of library materials, sorting, shelving and inventory management of library items and many other library workflows and processes will be tested out with RFID technology. Public's feedback and acceptance at different types of libraries would be closely monitored whilst more cost-effective solutions would be explored. The experience gained from the pilot study will be analysed in drawing up plans for the full implementation of RFID in the HKPL. A brief on RFID technology, its application and benefits to the library industry are set out at Annex 2.

Anticipated Benefits of the RFID Pilot Study

18. Adoption of the RFID technology, though on a pilot basis first, is expected to bring about the following benefits :

(a) simultaneous check-in and check-out of multiple items regardless of the orientation or alignment of the items will promote self-help services with the use of user-friendly self-service kiosks;

(b) efficient reading/checking of books on the shelves will assist library staff in stock-taking and in locating specific items to serve the public; and

(c) RFID sorters will minimise manual effort in the sorting of library materials and speed up the return of books to the shelves.

19. RFID technology would enable the provision of one-stop library services and further improve the delivery of library services to the community in an efficient and effective way.

Implementation Plan

20. The RFID Pilot Study would be implemented in parallel with the LAS replacement and launched in mid-2010, shortly after the launch of the core functions of the new LAS. A tentative implementation schedule is appended at Annex 1.

Project Estimate

21. The following estimates are based on the Market Research Request (MRR) methodology adopted by the FS to ask for cost quotations from global LAS vendors for their systems and services in order to obtain realistic budget estimation, and to assess the viability of their COTS library packages in satisfying HKPL's requirements.

Non-recurrent and Recurrent Expenditures of LAS Replacement and RFID Pilot Study

22. The LAS Replacement together with the RFID Pilot Study would require a non-recurrent expenditure of $196,467,000 over a six-year period from 2007-08 to 2012-13 (details at Annex 3) and a recurrent expenditure of $19,502,000 per annum as from 2013-14 and onwards (details at Annex 4).

23. The estimated annual recurrent expenditure of $19,502,000 will be partly offset by an annual savings of $8,839,000 being the running cost currently incurred in the existing LAS. The estimated additional recurrent expenditure arising from the proposed system is therefore $10,663,000 per annum and will be absorbed within LCSD's existing resources.

24. In addition, the proposed system would entail a non-recurrent staff cost of $17,822,000 over a five-year period from 2007-08 to 2011-12 (details at Annex 5). LCSD would absorb the non-recurrent staffing requirement from its existing resources.

Cost Savings/Avoidance of the LAS Replacement

25. In addition to the realisable savings of $8,839,000 per annum mentioned in paragragh 23 above, the proposed system would bring about the following notional savings/cost avoidance (details at Annex 6) :

(a) Notional savings of HK$4,923,000 per annum as the new system would enable deployment of lesser staff for acquisition, processing, compilation of reports and statistics, circulation of library materials (as a result of adopting RFID) and handling public requests on

reservation of library workstations; and

(b) Cost avoidance of about $340,000 per annum as the employment of additional staff for new services could be avoided as a result of using the new system to streamline existing workflows in reference service and management of electronic resources.

26. The savings in manpower will be redeployed to absorb the increase in workload arising from the growth in transaction volume.

Public Consultation

27. The proposed project is supported by the Committee on Libraries whose terms of reference are to advise the Secretary for Home Affairs on the formulation of strategies and plans for the development of HKPL's library facilities and services. In addition, library users' views have also been sought through the regular Customer Liaison Group meetings conducted by the HKPL. Users in general welcomed the enhancement of LAS which will provide better and more effective library services.

Way Forward

28. We plan to seek funding approval from the Finance Committee at its meeting scheduled on 9 February 2007 for the replacement of the LAS together with the RFID Pilot Study as recommended by the FS.

Advice Sought

29. Members are invited to support the implementation of the proposed computerisation project.

Leisure and Cultural Services Department
January 2007

Annex 1

Tentative Implementation Schedule of LAS Replacement and RFID Pilot Study

Activity	Target Completion
(a) Tendering and awarding of contract	March 2008
(b) Customisation of the new LAS - Phase 1	April 2009
(c) System Acceptance Test of the new LAS - Phase 1	September 2009
(d) Launch of the new LAS – Phase 1	December 2009
(e) Launch of RFID Pilot Study	June 2010
(f) Review of RFID Pilot Study	January 2011
(g) Customisation of the new LAS – Phase 2	March 2011
(h) System Acceptance Test of the new LAS – Phase 2	May 2011
(i) Launch of the new LAS – Phase 2	July 2011

Note:

Phase 1 – All core functions of the new LAS
Phase 2 – New and enhanced features of the new LAS

Annex 2

RFID technology, its application in library industry and benefits

RFID technology

1. Radio frequency identification, or RFID, is a generic term for technologies that use radio waves to automatically identify objects. The most common way of identifying an object using RFID is to store a unique number and perhaps other information relating to the object, on a RFID electronic tag.

2. Related RFID equipment includes RFID reader, RFID sorter, RFID drop-in box, RFID tagging workstation, etc.

RFID application in library industry and its benefits

3. In a RFID solution for library, a RFID tag which stores bibliographic information unique to each library item, will be physically stuck on the library item. Unlike the existing bar-code technology that requires line-of-sight precision reading and on item basis, RFID offers reading of multiple library items with RFID tags in one-go and hence improves overall performance for both check-in and check-out of library materials. Without the need of line-of-sight reading and proper alignment of library items for check-in/check-out, patrons will experience more user-friendly self-help services offered by the self-service kiosks.

4. Apart from enhancing the self-help services, a library can also introduce novel services such as round-the-clock return service using drop-in box so that patrons can return library items at anytime even after the library is closed.

5. RFID sorters can be installed alone or together with the drop-in box in different libraries for sorting returned items from patrons which not only save staff effort in sorting, but will speed up the return of library materials to the shelves.

6. With the use of RFID to support library operations, efficiency of staff operations on check-in and check-out of library items are anticipated to be

further improved. Furthermore, labour intensive processes such as inventory management and stock development will be assisted with portable RFID readers.

7. Savings in staff effort after applying RFID can be re-deployed to provide value-added services which require library expertise.

Annex 3

Non-recurrent Cost for LAS Replacement and RFID Pilot Study

	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Total
	$ '000	$ '000	$ '000	$ '000	$ '000	$ '000	$ '000
(a) Hardware	-	2,320	48,093	29,065	4,160	2,600	86,238
(b) Software	-	13,590	4,241	6,640	88	-	24,559
(c) Implementation	-	5,996	11,865	18,272	4,005	5,633	45,771
(d) Contract staff services	1,233	3,564	5,138	4,338	665	-	14,938
(e) Misc. (Site preparation, training, consumables, etc.)	-	-	4,018	1,820	256	255	6,349
(f) Contingency	123	2,784	7,660	6,245	951	849	18,612
Total	1,356	28,254	81,015	66,380	10,125	9,337	196,467

Note:

Item (a): comprises hardware for the new LAS and the RFID Pilot Study. The hardware includes database servers, application servers, web servers, other functional servers, network equipment, self-service kiosks, workstations, printers, RFID tags and RFID equipment.

Item (b): comprises system software for servers, client software, library software package and add-on software for new library functions.

Item (c): comprises implementation services of the new LAS and the RFID Pilot Study from external service providers. Main implementation activities include system study and customisation, system installation and configuration, system integration and testing, data migration, production rollout, nursing and feasibility study on the full implementation of RFID.

Item (d): comprises engagement of services of contract library and IT

professional staff to supplement the in-house project management teams.

Item (e): comprises site preparation including trunking and cabling for additional data ports, training for library and IT professional staff and consumables such as backup tapes etc.

Item (f): represents about 10% contingency on the cost items set out in Item (a) to (e).

Breakdown of Non-recurrent Cost for LAS Replacement Only

	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Total
	$ '000	$ '000	$ '000	$ '000	$ '000	$ '000	$ '000
(a) Hardware	-	2,320	48,093	8,713	4,160	2,600	65,886
(b) Software	-	13,590	4,241	6,640	88	-	24,559
(c) Implementation	-	5,996	9,383	15,219	4,005	5,633	40,236
(d) Contract staff services	1,233	3,564	3,461	2,660	665	-	11,583
(e) Misc. (Site preparation, training, consumables, etc.)	-	-	4,018	1,820	256	255	6,349
(f) Contingency	123	2,784	7,146	3,639	951	849	15,492
Total	1,356	28,254	76,342	38,691	10,125	9,337	164,105

Breakdown of Non-recurrent Cost for RFID Pilot Study Only

	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Total
	$ '000	$ '000	$ '000	$ '000	$ '000	$ '000	$ '000
(a) Hardware	-	-	-	20,352	-	-	20,352
(b) Software	-	-	-	-	-	-	-
(c) Implementation	-	-	2,482	3,053	-	-	5,535
(d) Contract staff services	-	-	1,677	1,678	-	-	3,355
(e) Misc. (Site preparation, training, consumables, etc.)	-	-	-	-	-	-	-
(f) Contingency	-	-	514	2,606	-	-	3,120
Total	-	-	4,673	27,689	-	-	32,362

Annex 4

Recurrent Cost for LAS Replacement and RFID Pilot Study

	2009-10	2010-11	2011-12	2012-13	2013-14 and onwards
	$ '000	**$ '000**	**$ '000**	**$ '000**	**$ '000**
(a) Hardware and software maintenance	350	6,577	10,131	10,561	10,821
(b) System maintenance	-	-	-	-	4,403
(c) Communication network	-	1,980	1,980	1,980	1,980
(d) Contract staff services	-	-	816	816	816
(e) Misc. (Disaster Recovery service, training, etc.)	-	1,179	1,482	1,482	1,482
Total	350	9,736	14,409	14,839	19,502

Note:

Item (a): comprises hardware and software maintenance of the new LAS and the pilot RFID study.

Item (b): comprises services provided by external service providers for ongoing application and technical support.

Item (c): comprises rental of all kinds of data lines and Internet connection.

Item (d): comprises the engagement of contract IT professional staff to supplement the in-house support teams.

Item (e): comprises the subscription of disaster recovery service, and ongoing training.

Breakdown of Recurrent Cost for LAS Replacement Only

	2009-10	2010-11	2011-12	2012-13	2013-14 and onwards
	$ ’000	$ ’000	$ ’000	$ ’000	$ ’000
(a) Hardware and software maintenance	350	6,577	7,967	8,397	8,657
(b) System maintenance	-	-	-	-	4,403
(c) Communication network	-	1,980	1,980	1,980	1,980
(d) Contract staff services	-	-	816	816	816
(e) Misc. (Disaster Recovery service, training, etc.)	-	1,179	1,482	1,482	1,482
Total	350	9,736	12,245	12,675	17,338

Breakdown of Recurrent Cost for RFID Pilot Study Only

	2009-10	2010-11	2011-12	2012-13	2013-14 and onwards
	$ ’000	$ ’000	$ ’000	$ ’000	$ ’000
(a) Hardware and software maintenance		-	2,164	2,164	2,164
Total	-	-	2,164	2,164	2,164

Annex 5

Non-recurrent Staff Cost

Rank	Total Effort Required (man-month)	Total Cost (HK$'000)
Chief Librarian	12.7	1,341
Senior Librarian	66	5,564
Librarian	128	6,915
Assistant Librarian	35	1,190
System Manager	22	1,078
Systems Analyst	50	1,450
Analyst Programmer	11	209
Project Assistant	5	75
	Total	17,822

Annex 6

Cost Savings/Avoidance of LAS Replacement and Pilot RFID Study

	2009-10	2010-11	2011-12	2012-13 and onwards
	$ ’000	$ ’000	$ ’000	$ ’000
(a) Realisable savings	-	8,839	8,839	8,839
(b) Notional savings	1,628	3,817	4,620	4,923
(c) Staff cost avoidance	-	-	227	340
Total	1,628	12,656	13,686	14,102

Note:

Item (a): Realisable savings as the running costs of the existing LAS to be decommissioned.

Item (b): Notional savings arising from the proposed system as the new system would enable deployment of lesser staff for acquisition, processing, compilation of reports and statistics, circulation of library materials (as a result of adopting RFID) and handling public requests on reservation of library workstations.

Item (c): Cost avoidance arising from the proposed system as the employment of additional staff for new services could be avoided as a result of using the new system to streamline existing workflows in reference service and management of electronic resources.

Breakdown of Cost Savings/Avoidance of LAS Replacement Only

	2009-10	2010-11	2011-12	2012-13 and onwards
	$ ’000	$ ’000	$ ’000	$ ’000
(a) Realisable savings	-	8,839	8,839	8,839
(b) Notional savings	1,628	2,171	2,778	3,081
(c) Staff cost avoidance	-	-	227	340
Total	1,628	11,010	11,844	12,260

Breakdown of Cost Savings/Avoidance of RFID Pilot Study Only

	2009-10	2010-11	2011-12	2012-13 and onwards
	$ ’000	$ ’000	$ ’000	$ ’000
(a) Realisable savings	-	-	-	-
(b) Notional savings	-	1,646	1,842	1,842
(c) Staff cost avoidance	-	-	-	-
Total	-	1,646	1,842	1,842