

For discussion
on 29 February 2016

Legislative Council Panel on Transport

Upgrading of the Transport Information System Project of the Transport Department

PURPOSE

This paper seeks Members' views on the proposal to upgrade the Transport Information System ("TIS") of the Transport Department ("TD") for enhancing the system performance to meet TD's operational needs.

BACKGROUND

2. Launched in 2008, the TIS is a major system of TD which serves as a centralised data warehouse that enables the processing, analysing and sharing of traffic and transport data by the staff of TD. It has several business functional modules, such as management of traffic improvement schemes, managing public transport services, and traffic accident blacksite identification, etc.

3. Some of the TIS services are available to the public in various forms, including the HKeTransport¹, the HKeRouting² and the Road Traffic Information Service ("RTIS")³. These services provide transport and road traffic information to the public, enabling public transport passengers or motorists to plan their journeys in advance. On average, the annual usage of these services has increased by about 700% since their first launch and their total usage was about 8.1 million times in 2015. The TIS also creates,

¹ Hong Kong eTransport provides public transport route searching service and produces results based on users' preference on shortest journey time, lowest fare or least number of transfers.

² Hong Kong eRouting provides driving route searching service and based on users' preference on shortest driving distance, shortest travel time or lowest toll.

³ RTIS provides real-time traffic information to the public, including special traffic news, real-time closed-circuit television traffic condition images, estimated journey time of the three cross-harbour tunnels and estimated traffic speed at major roads, so as to facilitate them to plan their journeys to avoid congestion.

updates and maintains the Intelligent Road Network Packages (“IRNP”)⁴, which is vital spatial data infrastructure to support the driving route searching function of HKeRouting. The IRNP is also open to academics for research purpose and the private sector for development of value added services⁵.

PROPOSAL

4. It is of utmost importance to maintain an effective and efficient TIS to enable the provision of traffic and transport services to the public. With the support of the Government Chief Information Officer, we propose to upgrade the TIS at an estimated cost of \$74,000,000 to extend its service life and enhance the system performance.

JUSTIFICATIONS

5. The hardware and software of the TIS, which were developed more than eight years ago, are becoming outdated and many spare parts are unavailable, rendering maintenance of the system more difficult. The 10-year maintenance contract of the existing TIS will expire in July 2018. With spare parts for the aged hardware unavailable, system failures may become more frequent. Moreover, some vendors may not provide up-to-date security patches for the outdated software, rendering the TIS vulnerable to threats of cyber-attacks. As a result, the reliability and availability of the TIS will be at stake.

6. Apart from maintenance difficulty, the current TIS was designed and developed mainly for processing and disseminating traffic data which are static in nature. In the Big Data era⁶, there is a growing need for efficient processing of a vast amount of real-time traffic and transport data (such as traffic speed and traffic flow) for analysing and predicting traffic conditions and better traffic management. The present system infrastructure cannot cope with the increasing demand for better service. For instance, it cannot

⁴ IRNP is a dataset on up-to-date traffic directions, turning restrictions at road junctions and stopping restrictions, etc in geographic information system (“GIS”) format.

⁵ IRNP is provided to the public at a charge, with sample dataset available for academics at concession price.

⁶ Big Data is a broad term for large or complex data sets which, after analysis using advanced techniques, can reveal much more useful information than that obtained from traditional data sets.

provide real-time prediction of traffic condition through rapid analysis of massive traffic data to assist motorists in making decision on alternative routing to avoid congested areas / roads.

7. With a view to exploring opportunities to enhance the services by deployment of technology, the TD completed an Information Systems Strategy Study (“ISSS”) and a Technical Review on System Infrastructure for the TIS in early 2015. Based on findings of the studies, it is concluded that the design approach of the existing TIS is still applicable and there is no need to redevelop the whole system⁷. Timely upgrading and replacement of the aged hardware and software is, nevertheless, necessary in order that the system’s service life can be extended for another ten years. The studies also recommend upgrading the system with enhanced functions and features to ensure the continuity of the public and internal services supported by the TIS, and to meet rising needs to cater for Big Data analysis.

BENEFITS

8. The upgrading of the TIS will bring about the following benefits –

(a) Better service to the public

The upgraded TIS will adopt the latest technology to minimise service disruption and system downtime to enhance the system’s reliability and availability. It will also provide better integration of the HKeTransport, HKeRouting and RTIS applications, so that more useful and personalised traffic information can be effectively and efficiently provided to the public.

Existing applications will be further enhanced for speedy dissemination of real-time traffic information to the public. The upgraded TIS will also provide improved system capabilities and processing power to facilitate development of more innovative applications. For instance, by analysing Big Data collected from various sources, real time traffic and transport information highly relevant to individual’s travel needs and location can be quickly filtered, so that personalised traveller information service can be provided to commuters.

⁷ Redevelopment of the whole system is estimated to cost about \$140 million.

(b) Better support to TD's operations

The upgraded TIS will be able to cope with the increasing demands not only from the public but also for improvements of TD's internal operation efficiency. It enables TD to carry out efficient collection and analysis of a vast amount of real-time data (including traffic flows, traffic speeds, traffic and transport incidents information, etc.) for better traffic and transport management. It can also provide better support for the use of mobile devices during field work, so that collection and updating of traffic and transport data can be done quickly and effectively. Further, the traffic and transport data in various forms (including texts, images, videos, etc.) can be processed in a much more efficient manner.

(c) Better spatial data visualisation and sharing

The latest GIS tool will be used to provide a visualisation of spatial data for better analysis to support traffic-related decision making. For instance, visualisation and analysis of real-time and historical traffic data (such as traffic speeds and flows for roads in an area) can facilitate the review of transport demand and the design of traffic improvement schemes. The upgraded TIS will also provide a better traffic and transport spatial data infrastructure, including real-time and historical data from road detectors and other channels, for sharing among government departments and other organisations. It will create an environment conducive to developing value-added services relating to smart mobility by the private sector.

(d) Better system security

Timely replacement of the ageing hardware and software will ensure the continuity of the TIS in providing reliable traffic and transport information services to the public, including special traffic news, traffic snapshot images, traffic speed map and journey time indicators. It also ensures that up-to-date security patches can be applied to safeguard the TIS.

FINANCIAL IMPLICATIONS

Non-recurrent Expenditure

9. We estimate that the total non-recurrent expenditure of the proposed upgrading of the TIS will be \$74,000,000 over four years from 2016-17 to 2019-20. The breakdown is as follows:

	(\$'000)				
Items	2016-17	2017-18	2018-19	2019-20	Total
(a) Hardware	0	4,940	9,355	1,070	15,365
(b) Software	51	2,547	9,574	2,190	14,362
(c) Communication Network	0	770	670	0	1,440
(d) Implementation Services	0	10,558	21,082	3,692	35,332
(e) Site Preparation	0	100	100	0	200
(f) Contract Staff	503	2,246	1,028	0	3,777
(g) Contingency	46	1,039	2,091	348	3,524
Total	600	22,200	43,900	7,300	74,000

10. Regarding paragraph 9(a) above, the estimate of \$15,365,000 is for computer hardware costs including servers, Storage Area Network and backup tape solution, network equipment, etc.

11. Regarding paragraph 9(b) above, the estimate of \$14,362,000 is for software licence costs for servers (web, application and database), including operating systems, application and web server software, database management system, report server software, system administration and monitoring software, etc.

12. As for paragraph 9(c) above, the estimate of \$1,440,000 is for subscription of required additional network bandwidth and the initial configuration.

13. As regards paragraph 9(d) above, the estimate of \$35,332,000 is for the acquisition of service from an external service provider for project implementation, including overall project management, design and setup, system and programme migration, data conversion, user acceptance tests (“UAT”) support, etc.

14. Regarding paragraph 9(e) above, the estimate of \$200,000 is for the site preparation work in the existing Primary Data Centre, Secondary Data Centre, and Development and UAT site.

15. As regards paragraph 9(f) above, the estimate of \$3,777,000 is for the contract staff costs for assisting in various implementation tasks.

16. Concerning paragraph 9(g) above, the estimate of \$3,524,000 represents a 5% contingency on the items set out in paragraph 9(a) to (f).

Other Non-recurrent Expenditure

17. A project team will be set up in TD for implementation of the proposal, including tendering, project management, support for system analysis and design, conducting UAT, etc. The project team will entail a total non-recurrent staff cost of about \$5,874,000 from 2016-17 to 2019-20. The cost will be absorbed within existing resources.

Recurrent Expenditure

18. The on-going maintenance and support of the upgraded system will require an estimated recurrent cost of \$10,530,000 from 2020-21 onwards⁸. The cost breakdown of the recurrent expenditure is set out as follows –

	2020-21 onwards \$'000
(a) Hardware and Software	4,460
(b) On-going Support Services	6,070
Total	10,530

⁸ For reference, the annual recurrent cost in 2015 was \$10,080,000.

19. As regards paragraph 18(a) above, the estimate of \$4,460,000 is for the maintenance of system hardware and the renewal of software licence for supporting the upgraded system.

20. As regards paragraph 18(b) above, the estimate of \$6,070,000 is for on-going system maintenance and support, helpdesk services, minor application enhancements, subscription of Wide Area Network links across data centres and TD offices, consumables, etc.

21. The relevant recurrent costs will be met from within existing resources. In addition, the staff in TD supporting the existing system will be redeployed to operate the upgraded system, hence no additional recurrent staff cost will incur.

IMPLEMENTATION PLAN

22. We plan to start the implementation of the project in the first half of 2016 for completion by the second quarter of 2018, to tie in with the expiry of the current 10-year maintenance contract. The proposed implementation plan is set out below:

Task	Target Completion Date
(a) Preparation of tender documents and invitation of tender	June 2016
(b) Tender evaluation and contract award	January 2017
(c) Project implementation	
- System design	June 2017
- System implementation and UAT	March 2018
- System live-run	July 2018

WAY FORWARD

23. Subject to Members' views, we plan to seek funding approval from the Finance Committee in May 2016.

ADVICE SOUGHT

24. Members are invited to provide comments on and support the proposal.

**Transport and Housing Bureau
Transport Department
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