**For discussion
on 28 June 2010**

Legislative Council Panel on Transport

Provision of Traffic and Incident Management System
in Transport Department

PURPOSE

This paper seeks Members' views on the Administration's proposal to develop a Traffic and Incident Management System (TIMS) in Transport Department (TD) to facilitate traffic and transport incident management and dissemination of real-time traffic and transport information to the public.

PROBLEM

2. We see a need to further improve our efficiency and effectiveness in managing traffic and transport incidents and in disseminating traffic and transport information to the public by taking advantage of the advancement in technologies.

PROPOSAL

3. The Commissioner for Transport, with the support of the Secretary for Transport and Housing and the Government Chief Information Officer, proposes to develop a TIMS in TD to facilitate traffic and transport incident management and dissemination of real-time traffic and transport information.

JUSTIFICATION

Background

4. On 9 May 2005, a number of fallen trees and scaffolding incidents due to inclement weather caused serious traffic congestions in extensive areas in Hong Kong. The Administration then appointed a Task Force on Emergency Transport Coordination to carry out a review on the mechanism for handling emergency traffic and transport incidents, including the management and

operation of TD's Emergency Transport Coordination Centre (ETCC)[1].

5.   The Task Force made 56 recommendations, comprising 44 short-term measures and 12 medium to long-term measures to improve the then incident management facilities and procedures. The Administration has implemented all short-term measures, a brief summary of which is at **Annex**. The recommended medium to long-term measures are related to the deployment of advanced technologies to collect, display, share and disseminate real-time traffic and transport information for incident management. These measures are summarized as follows:-

      (a)   harnessing advanced technologies such as automatic incident detection technology to strengthen emergency handling capabilities;

      (b)   exploring the feasibility of developing a computerized expert-system based traffic and transport incident management system to monitor incidents and help select and implement pre-programmed contingency plans based on contingency scenarios and lessons learned from past incidents;

      (c)   enhancing inter-departmental coordination through the development of a shared computer-aided system; and

      (d)   disseminating real-time information to the public about prevailing road traffic conditions and emergency transport arrangement.

Current Limitations

6.   In response to the above medium to long-term recommendations, TD studied the feasibility of deploying advanced technologies in traffic and transport incident management, particularly to address the following limitations in the existing traffic and transport incident management facilities:-

      (a)   a large proportion of the incident management process, i.e. from incident detection to incident recovery, is manually operated, thereby limiting ETCC's incident management capability;

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[1]   ETCC was set up by TD in 2000 and is responsible for monitoring and handling traffic and transport incidents on public roads. Currently, it handles about 3 000 traffic and transport incidents per year, at an average annual growth rate of 2-3%.

(b)   the Traffic Control and Surveillance Systems (TCSS) are designed and controlled as discrete elements, covering tunnels and control areas on a route basis.   There is no linkage between systems to allow comprehensive, effective and efficient traffic and incident management on a territory-wide basis; and

(c)   there is no data sharing platform to allow efficient dissemination of real-time traffic and transport incident information to the public.

The Proposed TIMS

7.   The proposed TIMS is a computerized system with the capacity to perform automatic incident detection, generate suggested traffic and transport contingency plans, provide a common view of traffic information to all stakeholders, streamline the dissemination of traffic and transport information to the public, and coordinate existing and future traffic management and surveillance systems at a single control centre.   It will also establish a common data platform for interested parties to acquire TD's traffic speed and incident information to develop their value-added services.   The proposed key functionalities of the TIMS are summarized below:-

(a)   it will fuse all available real-time traffic information, such as images from closed circuit televisions, journey times, traffic speed and density data, to perform incident detection;

(b)   it will include a Knowledge Based Expert System (KBEST), which is a sub-system to generate incident responses to help optimise and expedite response activities.   The sub-system will identify the impact of an incident on both the road network and the public transport services, and generate traffic and transport diversion plans based on pre-defined contingency plans and experience gained from previous incidents of similar nature.   These plans will assist TD in deciding how best to respond to an incident;

(c)   it will include another sub-system for all relevant stakeholders such as Hong Kong Police Force, Highways Department, public transport operators, on-site incident response team, etc. to report, view and update the information of an incident;

(d)   it will be designed with the capability to coordinate all TCSS through a single interface, which facilitates the management of incidents and, in the long term, efficient dissemination of traffic information through variable message signs on a territory-wide basis;

(e)   it will provide tools to issue electronic press releases and special traffic news to stakeholders such as the media and the public more efficiently; and

(f)   it will disseminate real-time traffic and transport information direct to the public through traveller information kiosks to be installed under the TIMS at strategic locations. It will include a data platform to facilitate private companies and relevant parties to extract traffic speed and incident information for the development of value-added traffic-related services.

Anticipated Benefits

8.   From overseas experience, the technologies to support TIMS are mature and proven.   The above functionalities will meet the imminent needs of the ETCC for more effective and efficient incident management.   In the long term, TIMS may be expanded to integrate dynamic traffic modelling[2] which is a promising but as yet consolidated technology for incident management.

9.   It is estimated that TIMS can reduce the duration of a traffic incident by 10 minutes on average, i.e. about 23%[3] of the duration of an incident.   The reduction in incident duration is due to the capability of TIMS to achieve quicker detection and confirmation of an incident, more efficient inter-departmental coordination among TD, Hong Kong Police Force and Highways Department, etc., earlier availability of response plan options for decision making, and more efficient mobilization of recovery teams.   As a

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[2]   Dynamic traffic modelling refers to the traffic modelling technique to assist in simulating the traffic impact of incidents by taking into account real-time traffic conditions.   With further application of dynamic traffic modelling in the KBEST system (mentioned in para. 7(b)), it can facilitate a more proactive analysis on real-time basis in generating traffic forecasts of the incident impacts and proposed response measures with current traffic conditions.

[3]   About 98.5% of incidents in Hong Kong are minor ones with an average duration of 44 minutes while the remaining 1.5% are major incidents lasting for much more than 44 minutes.   Minor incidents typically include vehicle breakdown, road-side debris and minor collisions whereas major incidents are those which happen at critical locations or require prolonged handling process, e.g. natural disasters, fire, etc.   For a 44-minute incident, a reduction of 10 minutes corresponds to about 23% reduction in incident duration.

result, affected roads will resume normal traffic quicker and less vehicles will be stuck in the traffic queues. The earlier dissemination of incident information through the proposed TIMS can reduce the severity of the traffic impact by alerting more motorists or travellers to use alternative driving routes or transport modes. In turn, it will relieve traffic congestion near the incident area, benefit the road network and reduce travellers' journey time as a whole.

10.   The economic benefit to be brought about by the proposed TIMS as a result of the reduction in incident duration is estimated to be approximately $359 million in a 10-year period from 2015 to 2024.

FINANCIAL IMPLICATIONS

Non-recurrent Expenditure

11.   We estimate that the implementation of the proposed TIMS will require a total non-recurrent expenditure of $100 million over five years from 2011-12 to 2015-16, with breakdown as follows:-

Non-recurrent Expenditure	2011-12 $'000	2012-13 $'000	2013-14 $'000	2014-15 $'000	2015-16 $'000	Total $'000
(a) Hardware	-	3,000	5,000	1,500	-	9,500
(b) Software	-	4,000	5,500	1,500	-	11,000
(c) Communication Network	-	1,000	3,000	1,000	-	5,000
(d) Implementation Services	-	9,000	17,000	5,000	1,000	32,000
(e) Contract Staff	720	1,430	1,430	520	200	4,300
(f) Site Preparation	-	1,000	3,000	500	-	4,500
(g) Training	-	-	200	500	800	1,500
(h) Consultancy Services	6,000	8,500	3,000	2,000	500	20,000
(i) Contingency (14%)	2,440	2,440	2,440	2,440	2,440	12,200
					Total:	**100,000**

12.   As regards paragraph 11(a) above, the estimate of $9.5 million is for the acquisition of hardware such as various servers (web, applications and databases), storage farms, operator workstations for the ETCC and other relevant stakeholders, video wall and its controllers for the ETCC and other associated equipments including traveller information kiosks, etc.

13. As regards paragraph 11(b) above, the estimate of $11.0 million is for the acquisition of software licence for servers (web, applications and databases), network management and monitoring software, application development tools, etc.

14. As regards paragraph 11(c) above, the estimate of $5.0 million is for the procurement of handheld communications devices and network equipment such as routers, switches, cables, communication infrastructure for use by the ETCC and other relevant stakeholders, etc.

15. As regards paragraph 11(d) above, the estimate of $32.0 million is for the implementation services by the contractors in developing and delivering the TIMS as depicted in paragraphs 7(a) – (f) above, including the necessary customization of the computer systems of other relevant stakeholders to interface with the TIMS.

16. As regards paragraph 11(e) above, the estimate of $4.3 million will be used for hiring of time-limited contract staff which consists of two IT professionals, to assist in the implementation of the TIMS.

17. As regards paragraph 11(f) above, the estimate of $4.5 million is for the modification works to the existing ETCC to accommodate the TIMS such as server rooms, cabling work, installation of conduit, power sockets, fire extinguishers for computer equipment, etc.

18. As regards paragraph 11(g) above, the estimate of $1.5 million is for the training in system development and operation for the TIMS duty officers and staff of other parties involved in traffic and transport incident management.

19. As regards paragraph 11(h) above, the estimate of $20.0 million is for the hiring of consultancy services. The scope of the consultancy comprises gathering of user requirements, carrying out the system design, preparing specification and tender documents for the selection of contractors in implementing and delivering the TIMS, as well as administering the contracts.

20. As regards paragraph 11(i) above, the estimate of $12.2 million represents a 14% contingency on the cost items set out in paragraphs 11(a) to (h) above.

21.　　　Apart from the above non-recurrent cost of $100 million, it is estimated that the Administration will incur $11.0 million additional non-recurrent staff cost for employing two IT professionals from April 2011 to June 2015 for the project delivery.　Such requirements will be reflected in the Estimates in the relevant years.　Other staff in the project team will be met by internal redeployment.

Recurrent Expenditure

22.　　　We estimate that the operation and maintenance of the TIMS will require internal redeployment of staff resources and incur an additional recurrent expenditure of $7.4 million for the first year (i.e. 2015-16) and $9.8 million for the second year onwards.　Such requirements will be reflected in the Estimates of the relevant years, with the breakdown as follows:-

Recurrent Expenditure	2011-12 $'000	2012-13 $'000	2013-14 $'000	2014-15 $'000	2015-16 $'000	2016-17 onwards $'000
(a) Hardware and Software Maintenance	-	-	-	-	600	800
(b) Communication	-	-	-	-	375	500
(c) System Maintenance	-	-	-	-	4,012	5,350
(d) Staff Cost	-	-	-	-	1,946	2,594
(e) Training	-	-	-	-	300	400
(f) Miscellaneous	-	-	-	-	150	200
				Total :	**7,383**	**9,844**

23.　　　As regards paragraph 22(a) above, the expenditure of $0.8 million is for the maintenance of system hardware and software.

24.　　　As regards paragraph 22(b) above, the expenditure of $0.5 million is for the maintenance of the communication network and Wide Area Network (WAN) links.

25.　　　As regards paragraph 22(c) above, the expenditure of $5.4 million is for the on-going maintenance and minor enhancement of application systems.

26.　　　As regards paragraph 22(d) above, the expenditure of $2.6 million is the additional staff cost for employing two IT professionals to maintain and provide on-going enhancement to the TIMS.

27.   As regards paragraph 22(e) above, the expenditure of $0.4 million is for on-going staff training.

28.   As regards paragraph 22(f) above, the expenditure of $0.2 million is for purchase of consumables and miscellaneous expenses.

IMPLEMENTATION   PROGRAMME

29.   Subject to funding approval, the implementation programme for the project will be as follows:-

Programme	From	To
Invitation, assessment and award of consultancy	December 2010	June 2011
System design and preparation of specifications and tender documents by the consultants	July 2011	December 2012
Development and installation of the TIMS by contractors	January 2013	March 2015
(a) Detailed design	*January 2013*	*June 2013*
(b) Site preparation, application development and system installation	*July 2013*	*March 2015*
Testing and commissioning	April 2015	June 2015

WAY   FORWARD

30.   We consulted the Transport Advisory Committee in May 2010 on the proposal and members supported the proposal.   Subject to Members' views on the proposal, we plan to seek funding approval from the Finance Committee of the Legislative Council in October 2010 with a view to implementing the project according to the time frame set out at paragraph 29 above.

ADVICE   SOUGHT

31.   Members are invited to comment on and support the proposal.

Transport and Housing Bureau
June 2010

Key Short Term Measures Implemented
In Response to the Task Force Recommendations

1. Developed contingency plans and conducted regular drills to test their efficiency.

2. Collated information collected from different sources on an incident map to assess the severity and spread of congestion.

3. Deployed mobile closed-circuit television to make the data collection process more effective.

4. Developed and launched an in-house web-based computer-aided inter-departmental communication system to facilitate the operation of the Emergency Transport Coordination Centre (ETCC).

5. Collaborated with radio stations to make more frequent broadcast of emergency traffic news including the information of alternative routes to facilitate diversion arrangement.

6. Established multiple channels for information dissemination such as uploading of emergency traffic and transport news onto TD's website, arranging TD spokesman to give sound bites, etc.

7. Reviewed and fine-tuned emergency transport arrangements having regard to the experience gained on 9 May 2005.

8. Established designated communication links among different departments to expedite remedial works.

9. Upgraded the facilities of the ETCC, e.g. set up a traffic information dissemination portal for information dissemination, procured computer equipment, 3G phones, etc.

10. Agreed with mobile network operators for the provision of CCTV images showing road traffic conditions and dissemination of special traffic news to their subscribers on mobile phones.

11. Installed Variable Message Signs at a number of strategic locations and junctions.

12. Improved the content of the messages issued to the media, especially radio stations, and provided clear indication of the degree of congestion and alternative routes.