LEGISLATIVE COUNCIL PANEL ON TRANSPORT

Application of IT to Transport Management

INTRODUCTION

This paper presents the findings of the Intelligent Transport Systems Strategy Review Study and seeks Members' comments on the recommendations for the development and implementation of Intelligent Transport Systems in Hong Kong.

BACKGROUND

2. **Intelligent Transport Systems** (ITS) refer to the deployment of advanced information and telecommunication technologies to enhance the safety, efficiency, reliability, user and environmental friendliness of the transport system. ITS is widely used in Europe, the U.S.A and Japan. Experience in these countries indicates that with ITS, travel time could be reduced by 20% to 40%; utilisation of road capacity could be increased by 17% to 25%; accident rate could be reduced by 15% to 50%; and fuel consumption could be decreased by about 40%.

3. In Hong Kong, we have implemented different aspects of ITS over the last twenty years, e.g. **Area Traffic Control System**[1], **Traffic Control & Surveillance Facilities**[2], Autotoll, Octopus Card and Electronic Parking Meter. However, they are mostly single-purpose systems and implemented independently on a small scale. The present day ITS emphasises integration of systems as well as integration of functions, transport and non-transport.

THE NEED FOR AN ITS STRATEGY

4. While the need for additional transport infrastructure to meet population growth and the corresponding increase in transport demand is getting more pressing, emphasis is also placed on the importance of meeting demand in a sustainable manner. In addition to provision of new infrastructure and

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[1] **Area Traffic Control System** is the real-time coordination and adjustment of traffic control signals within an area by computers having regard to changes in traffic flow level. The objectives are to maximise the use of road capacities and to minimise delay to traffic.

[2] **Traffic Control & Surveillance Facilities** includes the monitoring of road traffic conditions by CCTV or automatic incident detection equipment, and the management of traffic flows by variable message signs and lane control signals.

improved public transport services, we also need to find ways to maximise the capacity and to enhance the performance of existing transport systems. To this end, the development of an integrated ITS Strategy which meets the following objectives is required –

(a) better utilisation of existing transport infrastructure;

(b) greater efficiency in traffic management;

(c) better interaction among people, roads and vehicles; and

(d) enabling road users to make better and more informed choices on their transport needs through access to real-time road traffic information.

5. The Transport Department initiated an in-house ITS Strategy Review Study in May 2000 to develop a long-term ITS deployment plan. The Study examined the technical, administrative and financial requirements of implementing an ITS Strategy in Hong Kong to ensure that different systems developed under the Strategy are compatible and coordinated, and that seamless integrated services can be provided to all road users effectively and efficiently.

MAJOR FINDINGS AND KEY RECOMMENDATIONS

6. Currently, road users are often not aware of road accidents, road works or traffic diversion measures until they are at the spot. This could result in unnecessary congestion. Also, existing transport information is mostly paper-based or kept in isolated systems, and its usage has not been fully exploited.

7. The ITS Strategy Review Study recommends the establishment of a **Transport Information System** and the adoption of a new **Traffic Management Framework** to improve the situation. It further suggests that the private sector be encouraged to make use of these systems to provide tailor-made services to individual road users.

A. Transport Information System

8. The Transport Information System (TIS) is a central database responsible for the collection, processing, analysis and dissemination of comprehensive transport information including traffic conditions, progress of road works, traffic diversion measures, public transport services, and traffic

incident investigation. The information would be provided to the public directly or through service providers via variable message signs on roads, internet, media, and mobile phones. The TIS supports real-time updating and retrieval of traffic information. The advantages of TIS include –

(a) Government agencies would be able to plan and manage their transport-related operations more effectively. This means more efficient traffic regulation/diversion by the Police and better coordinated road maintenance works by Highways Department. Fire Services Department and the Police will also find it easier to avoid congestion points when deploying their emergency vehicles;

(b) transport operators such as bus companies, railway companies, tunnel operators and commercial vehicle fleet operators would be able to adjust their operation instantaneously having regard to any changes in the traffic conditions; and

(c) third-party service providers would be able to develop applications for fleet managers or individual road users by providing them with value-added traffic information via mobile phones, or in-vehicle reception units.

B. Traffic Management Framework

9. In Hong Kong, traffic is managed and monitored by computerised traffic signals operated through Area Traffic Control (ATC) systems, and Traffic Control & Surveillance (TCS) facilities installed on highways, such as Closed Circuit Television (CCTV) Systems, Variable Message Signs and Lane Control Signals.

10. However, the present ATC systems only cover the urban areas and the New Towns of Tsuen Wan/Kwai Tsing and Shatin/Ma On Shan, and the TCS facilities are only installed on limited sections of expressways such as Tuen Mun Road, North Lantau Expressway and Western Kowloon Expressway. These systems are controlled by their respective control centres with limited linkage among them.

11. To improve the situation, the ITS Strategy Review Study recommends that –

(a) ATC systems should be extended to cover all New Towns (**Annex A**);

(b) comprehensive traffic control and surveillance facilities including CCTV cameras, variable message signs and lane control signals should be installed on all existing and new expressways (**Annex B**); and

(c) all existing area traffic and expressways control centres, as well as TD's Emergency Transport Co-ordination Centre[3], should be subsumed under a single centre, the Traffic Management and Information Centre (TMIC), for more effective coordination of traffic and incident management of the whole territory.

12. The TMIC would in future replace the existing control centres and take direct control of all existing and future ATC systems and TCS facilities. In case of emergency and major accident with widespread impact, the TMIC would also be responsible for coordinating with tunnel/bridge operators, the Police, other Government departments and transport operators, in managing traffic.

C. Private Sector Initiatives

13. TIS and TMIC would form part of the transport infrastructure to be provided by the Government to make our transport system more efficient and user-friendly. In addition, they would provide the necessary information to facilitate commercial utilisation such as development of navigational guidance systems for motorists and fleet management systems for public transport and freight operators. With the emergence of the 3rd Generation Mobile Phone, it is expected that general information packages and personalised services for individual road users would also become more popular.

BENEFITS OF "ITS"

14. The implementation of ITS would bring about significant benefits to our society. With more effective and efficient transport management, road capacity would increase and travelling time could be saved. Provision of ITS to produce more road capacity is also a more cost-effective alternative to the building of new roads. According to overseas experience, existing road capacity could be increased by about 20% with the full implementation of ITS. To achieve the same result by building new roads in Hong Kong, the

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[3] As at present, TD's **Emergency Transport Co-ordination Centre** is activated when major road incidents occur or when emergency transport management is required. The Centre is responsible for the co-ordination between Government agencies and transport operators to provide temporary traffic arrangement and transport services for affected motorists and passengers.

construction costs alone (without taking into account land costs, technical feasibility and the environmental impacts) would cost at least $30 billion, i.e. 10 times the cost of implementing ITS (see paragraph 19).

15. In terms of travelling time, overseas experience shows reductions ranging between 20% and 40%. Assuming similar reductions in Hong Kong, the estimated annual economic benefit would be in the order of $14 billion to $28 billion. As a result of reduction in travelling time, fuel consumption and therefore vehicle emissions would also decrease. This is in line with our objective of reducing roadside air pollution.

16. With improved traffic control, automated enforcement and coordinated incident management, ITS could also reduce the occurrence of traffic accidents and lessen the probability of fatality arising from traffic accidents, making our transportation system much safer for all road users. According to overseas experience, a reduction of 15% in accident rate could be achieved, avoiding a loss of $ 175 million annually.

17. Implementation of ITS will further enhance support to trade and commercial activities through better fleet management, hence reducing operating costs and increasing productivity. The whole community will enjoy better services provided by a smarter transportation system. Implementation of ITS in Hong Kong could also help alleviate pressure for constructing new transport infrastructure which will contribute to sustainability in the future development of Hong Kong.

18. ITS is now an established trend in developed countries like the U.S.A., U.K. and Japan. Development of ITS in other Asian countries, such as Singapore, South Korea and Mainland China, is also advancing rapidly. Hong Kong would need to press ahead to maintain her competitiveness. It will also enhance the image of Hong Kong as a leading international city.

FINANCIAL IMPLICATIONS

19. Over the next ten years, a total of $3.2 billion would be required for the implementation of the TIS, extension of the ATC System to all New Towns, installation of TCS facilities on all major expressways, and the setting up of the TMIC. A breakdown of the estimated expenditure is as follows –

Item	***Estimated Cost ($M)***
TIS	64
ATC	610
TCS	2,219
TMIC	210
Others (e.g. journey time indication system, speed enforcement cameras)	135
Total	**3,238**

20. To implement the proposed ITS Strategy, the creation of one Chief Engineer and one Chief Systems Manager in the Transport Department is required to oversee and steer the planning, design and implementation of on-going and future ITS projects. We will be approaching the Council in the coming few months on funding for individual projects.

IMPLEMENTATION TIMETABLE

21. Implementation of the TIS is scheduled to commence in late 2001. As part of the project, a public transport inquiry sub-system will be developed to encourage the use of public transport services and to facilitate pre-trip planning by passengers. Information on routes, stops, schedule and fare level of public transport services will be put under one system for free and easy access by passengers through Government Web pages. This sub-system would be ready for public use by early 2003 with the whole system to be completed in 2003/2004.

22. Extension of the ATC System to cover the remaining New Towns will be implemented in phases from 2001. The System will first be extended to Tai Po and North Districts at an estimated cost of $101 million. System design and installation works are expected to start in September 2001 for completion in November 2003. Extension to Tuen Mun and Yuen Long will then follow with works to start in 2003 for completion in 2005. We also plan to extend the ATC System to cover Tseung Kwan O after that.

23. Apart from the extension of the ATC System, journey time indicators on approach roads to cross-harbour tunnels and strategic routes would also be installed in 2002 and 2003 at an estimated cost of $20 million. The indicators aim to advise motorists of traffic conditions on alternative routes so that they could make an informed choice on their route well ahead of critical diversion points.

24. The provision of comprehensive TCS facilities will become a standard feature of all new expressways and trunk roads. As regards existing expressways, the provision of such facilities will be implemented in stages in conjunction with relevant road improvement works. The first project is the Tolo Highway which is being implemented in phases from 2001. By 2010, it is anticipated that most of the major expressways will be covered with comprehensive TCS facilities.

25. The preliminary project feasibility study of the TMIC will be completed shortly. We plan to start the design and construction works in 2002 and the Centre would start operation in 2006. Once the TMIC is in operation, real-time traffic information would be fed into the TIS. Apart from the TMIC, instantaneous information feedback from the transport service operators, tunnel operators and other commercial fleet management would also be fed into the system to ensure that road users have access to comprehensive and updated information.

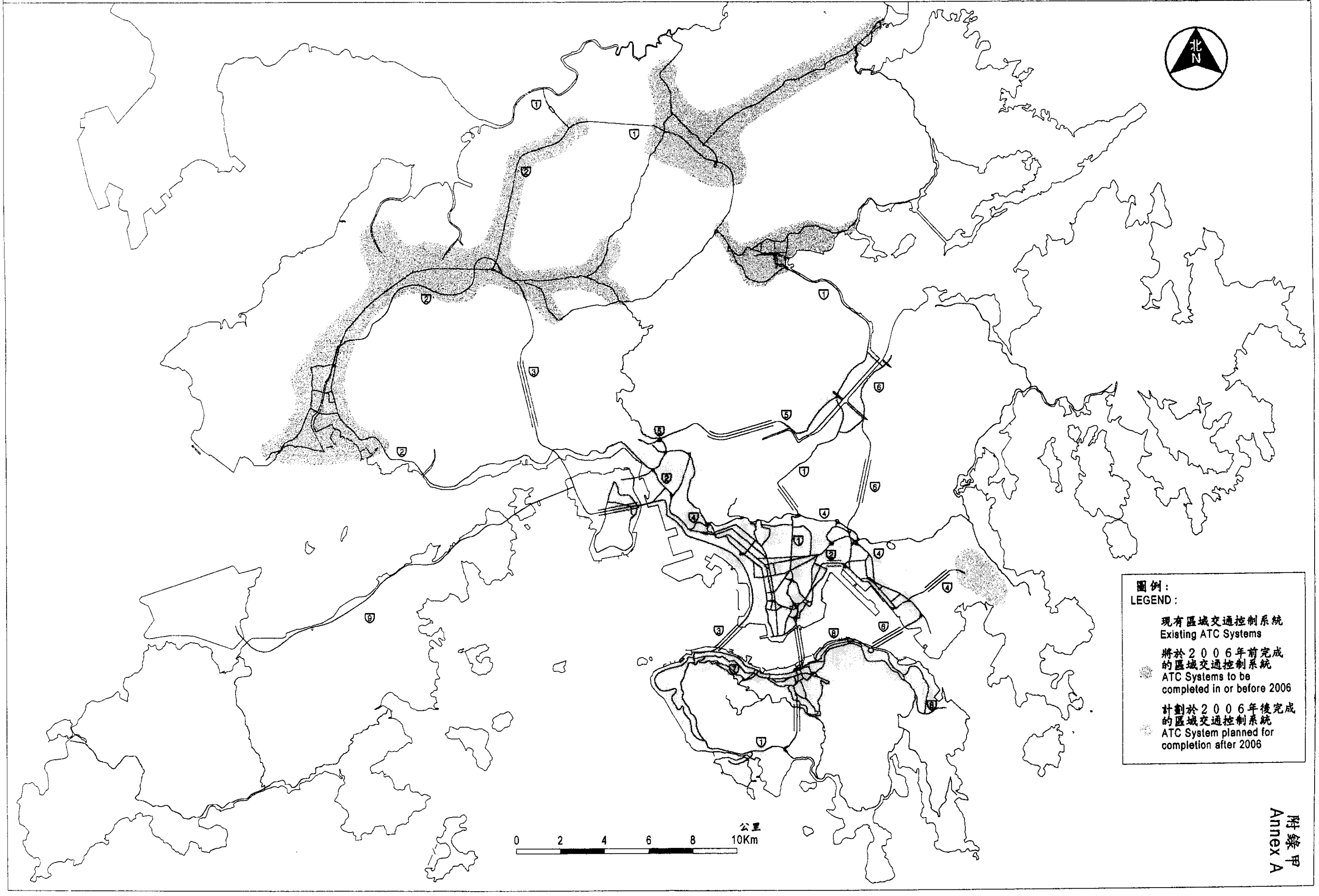
ADVICE SOUGHT

26. Members are invited to comment on the recommendations on the development and implementation of Intelligent Transport Systems in Hong Kong.

Transport Bureau
Government Secretariat
TRAN 3/11/94 Pt 2
12 March 2001

附錄甲
Annex A

現在及將來由區域交通控制系統控制之範圍
Existing and Future Coverage of Area Traffic Control Systems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圖例：
LEGEND :
現有區域交通控制系統
Existing ATC Systems
將於２００６年前完成的區域交通控制系統
ATC Systems to be completed in or before 2006
計劃於２００６年後完成的區域交通控制系統
ATC System planned for completion after 2006
公里
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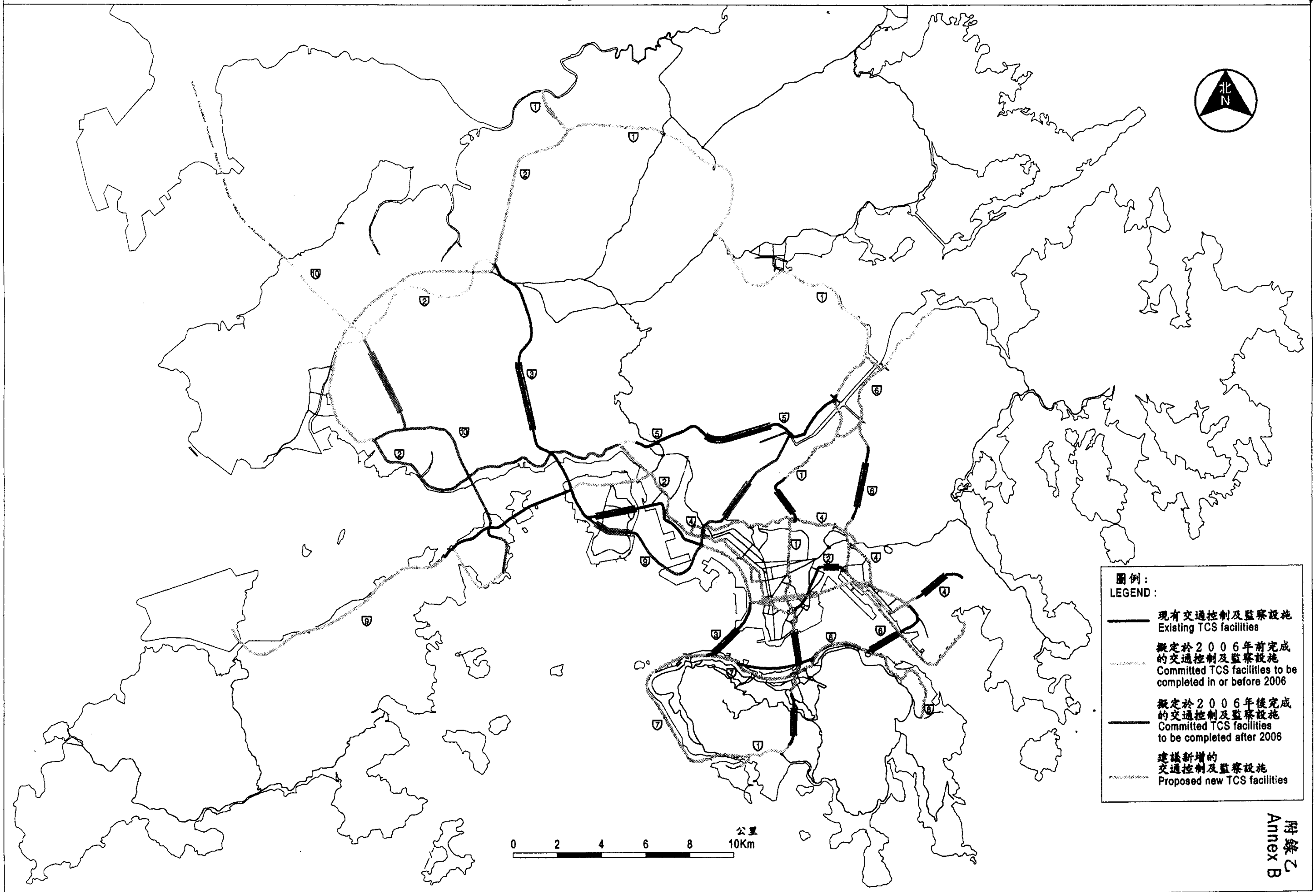
附錄乙
Annex B

現在及將來交通控制及監察設施之覆蓋範圍
Existing and Future Coverage of Traffic Control & Surveillance Facilities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圖例：
LEGEND：
現有交通控制及監察設施
Existing TCS facilities
擬定於２００６年前完成的交通控制及監察設施
Committed TCS facilities to be completed in or before 2006
擬定於２００６年後完成的交通控制及監察設施
Committed TCS facilities to be completed after 2006
建議新增的交通控制及監察設施
Proposed new TCS facilities
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