



Upwardly mobile

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In the third and final article in the series, TTI reviews how ITS technologies are being implemented in the Asia Pacific region

Technologies that enable the provision of customised real time information for travel planning and fleet management purposes already exist. These technologies permit identification of vehicle location, mobile transfer of data, and provision of tailored information to match the characteristics of the trip and the customer profile. But sustainable business models have proved elusive in the transport sector. In the countries of the Asia Pacific region that display a wide variety of income levels, the experience with so called 'mobility management' technologies is much the same as in the west – patchy. Nevertheless, there is no shortage of new initiatives across the region.

A basic pre-requisite for mobility management technologies includes firms that need to be competitive and hence wish to efficiently allocate resources. At the individual level, incomes need to be fairly high and personal time regarded as valuable. These pre-requisites can usually only be met in economies that are fairly wealthy – within the region, these countries would include the developing and

developed economies such as Thailand, Malaysia, Singapore, Taiwan, South Korea, Japan, Australia and so on. Within the People's Republic of China the wealthy provinces and regions include those within the triangle formed between Beijing, Shanghai and Guangzhou, plus Hong Kong.

Mobility management technologies that are commonly encountered in the region include:

- Fleet management for police, emergency and commercial vehicle fleets;
- Advanced real time traveller information for personal travel;
- Mobile office applications for field workforces – space limitations prevent us from covering this aspect further here.

On the fringes of the transport sector, advanced mobile information services such as mobile Internet and information (i-mode) developed by Japan's giant telco NTT exist. DoCoMo launched i-mode in Taiwan in June 2002 after making its foreign debut three months earlier with its launch in Germany. DoCoMo expects to have i-mode available in Malaysia in the first half of 2003.

Wealthier economies also have developed much of the supporting infrastructure including appropriate wireless communications networks. Following early analogue systems, the second generation (2G) of mobile communications using the GSM standard is now common.

Data communication, however, typically requires short bursts of information to be transmitted at a high data rate, interspersed with periods of inactivity. Such data is best carried by a wide band of frequencies (broadband) where information can be multiplexed and sent on many different frequencies or channels within the band concurrently, allowing more information to be transmitted in a given amount of time.

The third generation (3G) of mobile communication aims to provide users with broadband packet-based transmission of text, digitised voice, video and multimedia at high data rates, up to 2Mbps (megabits per second). In the Asia Pacific region, as elsewhere, there is a transition, with 2G networks initially offering some enhanced services, similar to basic 3G services, including WAP and GPRS. Such enhanced 2G services are

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Seoul bus Passenger Information Display



Beijing buses have their own GPS trial

often referred to as 2.5G (generation 2.5).

Wireless application protocol (WAP) is a communication protocol that standardises the way that wireless devices, particularly cellular phones, can be used for Internet access, including web-based email. WAP uses wireless markup language (WML), a simplified version of the hypertext markup language (HTML) widely used on the Internet. Japan's i-mode is a variant and offers colour and video over appropriate mobile phones. GPRS (general packet radio service) offers continuous access to packet-switched data transfer at significantly higher transfer rates than that offered by trunk radio, DataTAC/Mobitec and GSM networks. Recent advances in wireless local area networks (WLAN) may also complement GPRS and upcoming G3 solutions.

So, what is the recent experience with mobility management technologies in the region?

Taiwan

"The application of ITS technology to taxis and commercial truck fleet management has been heating up over the past two years," says David Poo, chairman of THI Enterprises, Inc, Taiwan.

The Government has begun projects that will track the movement of vehicles transporting hazardous materials and 'very heavy' vehicles.

For taxis, a new Taipei taxi company that is using technology (from Singapore) for GPS-based dispatching has been formed and has just started commercial operations.

"Even though the economy is slow, during the first month of operations, the new system has already made a difference for the drivers using the new system. Their passenger occupancy rates by both distance and time are 10 per cent up on those drivers not using the GPS tracking system," says Poo.

Korea

During 2003, Seoul's bus passengers will be able to obtain real time information from intelligent touch screens at downtown bus stops and through their mobile phones.

With 60 bus companies in metropoli-

tan Seoul carrying 35 per cent of public transportation trips, delivery of real time information on actual bus arrivals to passengers via passenger information displays (PIDs) at bus stops is a priority. The 'bus command' system uses global positioning system (GPS) satellite-based location tracking technology and wireless communications solutions to track the buses.

A control centre will track buses and monitor location, speed, and fuel use. The centre will provide drivers with traffic information, including their proximity to other buses, to help better regulate schedules and prevent speeding. The system is being rolled out initially on main trunk bus routes. An earlier US\$1.5 million pilot project was carried out for seven months in 1997 under the responsibility of the Seoul Bus Transportation Association in Seoul's Chongro il-ga and Tongdaemun areas.

Singapore

Singapore's stated goal is to develop a world class transit system. Taxis already have fleet management systems using the Global Positioning System (GPS). The key strategy for integrating transport systems information (including from rail) is iTransport consisting of:

- Traffic.Smart – traffic information integration, implemented;
- Transit.Smart – public transport information integration; an island-wide Bus Travel Information System to provide highly accurate, real-time bus travel information covering 4000 buses and 1000 bus-stops; commenced roll-out. It involves building the first and largest private Tetra communications network in Asia;
- Route.Smart – multi-modal route advisory system, in-progress; and
- Manage.Smart – integrated traffic management systems for management and monitoring.

Transit.Smart is the government initiative that replaced the earlier attempt at having individual bus companies provide their own real-time information systems. This proved problematic and would probably not have led to an integrated bus information system for Singapore.

In late February 2003, the Land Transport Authority announced that they had cancelled the contract for Transit-Smart because of software and integration problems.



Beijing trucks are now part of the modern supply chain

Transit.Smart was to have been completed in two stages. In the first, a radio communication system to transmit signals from buses on the roads to the information panels at bus stops and interchanges, and to a control centre, was to be developed.

In the second phase, the radio communication system would be integrated with the fleet management systems developed by SBS Transit and Trans-Island Bus Services (Tibs) to track the position of their buses on the roads. This is where problems arose and the LTA decided to drop the project, said its spokesman.

While the algorithms and platform for Route.Smart are under development, there has been little progress with potential private sector value added service providers to provide traveller information services on a commercial basis. Instead the information will initially be provided on the Land Transport Authority's web site.

During mid 2002, the Singapore Land Department called for tenders from private sector firms wishing to access the Department's GIS property data bases for use in developing mobile information services. Ancillary applications include the location-based service (LBS) launched by Siemens Mobile in Singapore in 2002 on Singapore's M1 network. The proximity search and location information service attracted over one million subscribers and gained a market share of 33 per cent by July 2002".

Malaysia

There are at present limited applications of automatic vehicle location systems in commercial vehicles. Telekom Malaysia launched a new service for tracking vehicle location in 2002. Called TMAVL the service is designed mainly for security applications in the event of vehicle theft and for monitoring the location of loved ones.

Telekom Malaysia's TM geomatics division designed the system using a combination of GPS, network communication and geo-spatial system technology. Locations are said to be able to be determined to between one and 100 metres. For some mobile phone users the tracking can be similarly done. The location of the vehicles can be monitored using the Internet with access provided by TMAVL.

Towards the end of 2002, Siemens

Mobile announced the launch of its LBS service in Malaysia.

China and Hong Kong

An early application of fleet management systems in commercial fleets was in the Shanghai Dazhong Taxi Company that undertook a private program to install the first taxi auto-despatch system in 1998. Since then similar systems are now found in other taxi fleets, major bus fleets in urban areas and some private truck fleets.

Taking advantage of China's explosion in vehicle growth (in 2002, one million cars were produced with most aimed at the domestic market), during 2002, Toyota-affiliated Aisin AW and Fujitsu Ten, a unit of Fujitsu, plan to set up a joint venture in China with local manufacturers to develop and market car navigation systems. The new firm, to be established in Beijing, will market the car navigation system employing GPS technology and audio-visual equipment developed by Fujitsu Ten.

In Hong Kong until recently, GPS use in fleets generally was limited in part because of the fragmented commercial industry structure, "urban canyon" type problems that are quite common in a dense city like Hong Kong that frustrate use of GPS, as did the downturn in the economy after 1997.

Until 2002, there was only a cement truck company, three fleet despatchers and a utility van company using GPS for fleet management. In addition, Hong Kong Gas, Hong Kong Telecom and Hong Kong Electric were looking at prototype systems to track their utility service vehicle fleets.

All bus companies have now committed to using automatic location fleet based management systems. Integrated methods of vehicle location appear to be satisfactory and make use of a combination of:

- GPS;
- Differential positioning; and
- Direction and dead reckoning.

During August 2002, the Hong Kong government announced the commitment of HK\$6 million (US\$750,000) for academic and industry players to develop a mobile location estimation system (MLES) and related applications. The MLES, based on existing mobile phone infrastructure, is an alternative to a GPS but more accurate and cost-effective



A Hong Kong bus stop cluttered with passenger information displays



Bangkok Mass Transit

according to the developers at Hong Kong Baptist University and the Hong Kong Institute of Vocational Education.

Hong Kong's Transport Information System tender (TIS) that closed in July 2002 has been evaluated and a decision on the preferred tenderer was imminent in January 2003. TIS is envisaged as a platform for making available to the public up to date, real time information on all transport modes much the same as Transit.Smart in Singapore.

Shell, with three other parties, Webraska (providing the platform to move the content to the mobile), Sunday Radio (incident feed) and Custom Traffic (processing of data to output content) combined to provide the first commercial service in Hong Kong that was launched in early 2002. But Shell, the prime investor, withdrew in late 2002 due to limited uptake in the market.

Custom Traffic's technology provides real time traffic information and journey time forecasts based on its database of journey time histories for all of Hong Kong and its patented forecasting approach, using profiles provided by subscribers as well as dynamic real time updates based on traffic reports. Travel time advice has been shown to have an absolute error of two to three minutes on average even during peak hours.

The pricing of the service was about US\$4 for a monthly subscription, 20 cents, for an SMS message and 60 cents for a journey assist call.

At the end of 2002, Custom Traffic announced its intention to re-enter the Hong Kong market and ultimately that of mainland China.

Thailand

There is limited use of mobility management technologies in commercial fleets in Thailand. But things are changing.

Bangkok's local government, the Bangkok Metropolitan Administration (BMA), received a grant worth Bt31 million (US\$0.75 million) to study and develop an in-car navigation system for a pilot area within central Bangkok. The aim is to create a system to assist in route planning with a navigable, intelligent database that can be installed in computers and personal digital assistants.

A first ever of its kind in Thailand, the project is scheduled to be completed by April 2003.

Noppadol Luangdilok, deputy director of the Department of Traffic and Transportation of Bangkok Metropolitan Administration, says they have received technical assistance from the European Commission, the National Geographic Institute of France and Liege University of Belgium to develop the in-car navigation system for a pilot area of 25km².

Data to be collected and digitised will include roads and traffic, buildings, companies, government offices, hotels, restaurants, temples, tourist attractions and other landmarks.

At the same time, the private sector has initiated a range of security and may-day type services for fleets and individuals. Thailand's Advanced Mobiz Tech announced its aim to provide GPS tracking technology to the consumer market in April 2003. The company plans to offer this as the first step in the roll-out of household wireless services.

G-Secure has been linked with Advanced Info Service in offering anti-theft systems for automobiles. The vehicles are fitted with devices which make it possible to immobilise them by remote as well as track them by satellite. By the end of 2002, a total of 4,000 land and water vehicles were monitored by the company's G-Track, G-Secure and Power-G services.

Loxley, a large Thai trading company, has also set up ThaiLocation Tracking Centre (TTC) that provides satellite-based service that can deter car thieves and track vehicles that are stolen. The tracking software was developed by Loxley's trading partner, Mappoint-Asia, a high-resolution digital mapping company.

The system consists in part of a basic anti-theft tracking system, Viper, which is imported into Thailand by MappointAsia's trading partner, DEI. The system has been integrated with MappointAsia's GPS service, making the tracking of stolen cars more efficient. Some 400 companies, including Shell and some commercial banks, are using the service, as well as 30,000 individuals.

Due to massive investment by foreign super market chains in Thailand, modern logistics practices are now being employed. Overseas operators such as Makro and Tesco have pioneered these advances that have filtered down through the labour force, the suppliers and sub-suppliers. The supply-chain process of the retail consumer market sector is well advanced in Thailand compared to other countries in South East Asia.

Trends

The examples provided above are a bit of a 'cooks tour' but do serve to illustrate the extent and range of investment in mobility management applications of the Asia Pacific region. As in the west, the applications that show the most commercial potential are fleet management and supply chain management technologies that drive down costs and improve levels of service, or have a security or mayday role. Expect to see more of these.

Governments have an important role in establishing appropriate frameworks for infrastructure provision, collation of real time information from their many transport applications and involvement of the private sector for value adding data and information dissemination on an appropriate basis. ■

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