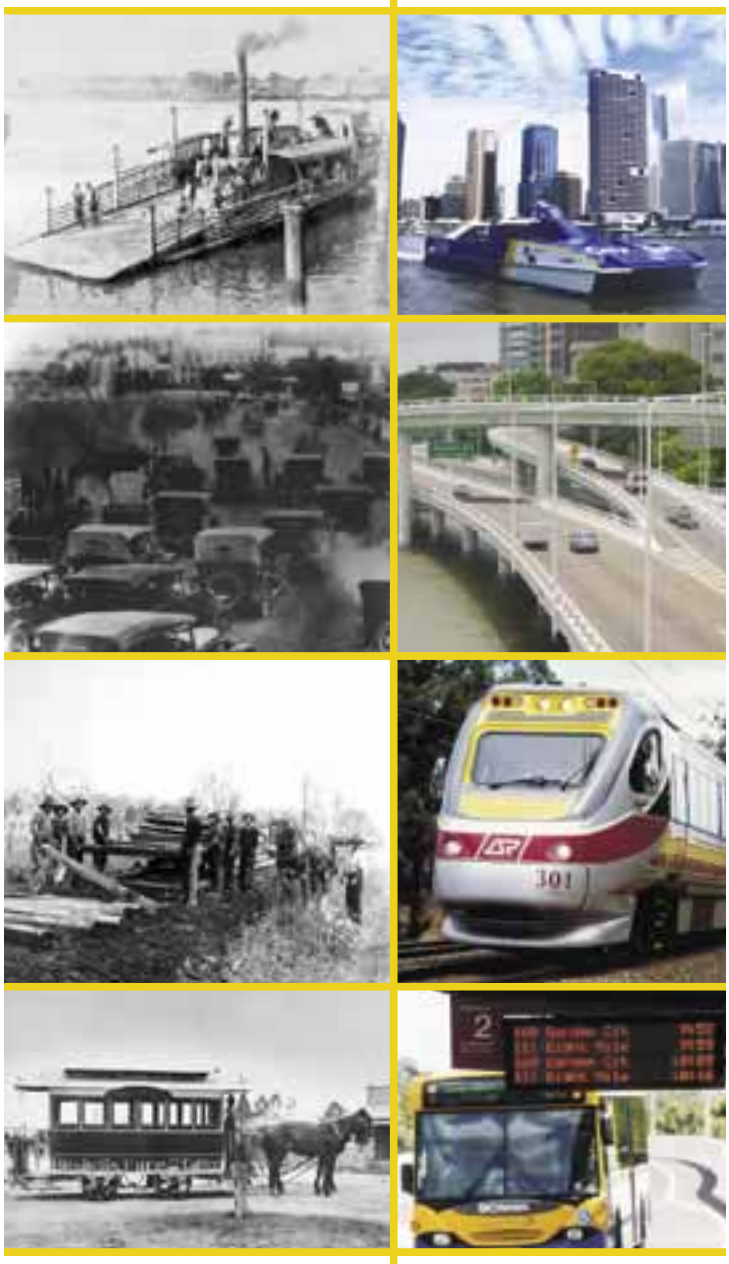

Multimodal Intelligent Transport Systems Strategy for Queensland

2005 - 2013

Queensland Government
Queensland Transport
Main Roads

Contents

The vision for Intelligent Transport Systems in Queensland (in 2013)

Hello and welcome to the year 2013. My name is Paul and I subcontract to a freight management company. I've been driving all over Queensland for about ten years now and I've got to tell you, there have been some amazing changes in the transport system during that time. This is largely due to the technology across the road and rail network, at inter-modal freight depots, in the public transport system and in-vehicles.

I live in Warwick but today after my usual run to Goondiwindi I'm heading to Brisbane. My Dad who lives in Brisbane had a heart attack yesterday. So I'm heading in to visit him in hospital and to spend a bit of time with the family. My mum and my sister are with him, and although this trip takes a long time at least with all the intelligence available to me in my truck and throughout the road network, I can pretty accurately predict my arrival time.

Technology used on the road is helping me to work smarter and safer: variable message signs (VMS) around the State warn me in real time of road closures due to flooding. This also means they let me know when roads have re-opened in real time as well. No guesswork, and waiting time is reduced. Take the truck stop near Windorah, for example: according to the variable message signs in town, which have a real time link to the flood warning system on the Condamine River, the road through Pittsworth will be closed for another two days. The advance warning from the location of this sign means that I can head to Inglewood instead of Pittsworth and avoid the delay. It is a few kilometres further to travel but I have to get to the hospital and the extra distance beats waiting around for the water level to drop.

This place has got a remote world wide web access point allowing me to link up to the Internet directly in the cab of my truck. This is only active when my truck is stationary. The alternative to driving is flying. I check out the next schedule flight from Windorah to Brisbane but unfortunately it's not due until tomorrow. I hope Dad hangs in there as I hit the road.

Wireless Local Area Network

Information systems using this type of technology are springing up all over the State. As well as the VMS, there are dedicated radio broadcasts on sub-band frequencies, remote web access points (using Wireless Local Area Network technology) and at some places real time information on road closures and flooding. Also warnings for heavy vehicles on steep grades can be downloaded directly into the onboard satellite navigation system I have in my truck. It is handy for travelling around large cities but invaluable on long distance outback trips where flooding can cause long road closures. The devices look and work the same wherever I am in Queensland, so I know what information is available and how to access it. The thing that impresses me most is the accuracy and timeliness of the information on the signs. When there is a delay ahead, systems operated by Main Roads can tell you in real time how long it will be and how to get around it. When a crash does occur, which is pretty rare these days, most vehicles are linked into an emergency distress call system that responds to the call, sending the right help quickly.

Freight Route Management

In larger rural towns and on preferred freight routes in south east Queensland the traffic signals, aware of my size and weight, synchronise for me keeping noise down in rural communities and minimising damage to the road. There are also a few fixed speed cameras around the place that steady me up.

ITS in commerical vehicles

My truck is equipped with a host of ITS devices. Satellite navigation and phone capabilities, web access, speed limiter, "heads up" display of my "vitals" (speed, revs, fuel and so on) on the windscreen, automatic crash notification, blackbox recorder as well as systems that notify the relevant authorities if I venture into areas where I'm not permitted due to my weight or the dangerous nature of my load. ITS devices also allow my boss to know if my truck is overloaded, from data communicated through on board weighing systems, and can help me detect and manage fatigue.

An advanced international system for sea based freight management has been introduced to accurately predict when cargo will be available for land loading

When I got the news about my Dad, I sent a text message (voice activated using the speech activation capacity of my phone) to my principal freight contractor. This allowed me to get a few days off and to make myself available for a pickup from the Port of Brisbane when I go back on the roster. This opportunity to save time and speed delivery is possible due to an advanced international system for sea based freight management that has been introduced to accurately predict when cargo will be available for land based loading. Text messages tell me about any delays and when my container will be available at the port. The integrated cargo handling system at the port has reduced delays to loading and allowed us to take advantage of backloading opportunities when possible. It coordinates the ship's location and speed data with its manifest so timing your run is a breeze.

I arrive at my sister Cheryl's place at 6:00pm. I'm tired, but I know that after a good night's sleep, I'll be in better form to visit Dad. Cheryl lives in the thriving new suburb of Foxgrove, south of Beenleigh, 45 km by road to the centre of Brisbane and only 6 1/2 km from the Beenleigh train station.

Like other outlying areas of south east Queensland, Foxgrove has undergone intense urban development in the past 10 years. Formerly a rural residential subdivision, it now boasts over 10 000 residents. South east Queensland has experienced 80% of the State's 2% annual population growth over the past 10 years. That makes around a 30% population increase in the south east corner since 2003, which has brought the region's population to just over 3 million. It has fuelled a lot of subdivisional development, along with some pretty amazing transport developments, particularly passenger transport.

My Dad's heart attack was very severe; they say he is lucky to be alive. But his is one of the many success stories you hear about these days and it was thanks largely to the integrated systems used by emergency services and the traffic management centre. Cheryl fills me in on the whole story: yesterday was his usual day for coming to town to meet his friends at the Tattersall's Club. He suffered a heart attack while standing at the bus stop. A waiting passenger called an ambulance for him and stayed to help. It was the capacity of both emergency services and the transport network to respond to this call that saved his life.

Computer aided dispatch and integrated traffic management

The computer aided dispatch system of emergency services brought the ambulance there very quickly. Getting him to the hospital was critical and a great challenge at peak hour. Luckily for Dad, the south east Queensland Integrated Transport Management Centre operates a system to move emergency vehicles through the network safely and efficiently. The Emergency Vehicle Priority system synchronised the traffic lights and train signalling to give priority at rail crossings along the route, ensuring the success of this life saving trip.

On demand passenger transport

Cheryl and I decided that passenger transport was the best way to get to town. From out here, that means catching the local bus to the train station, and then the train to town. This new housing estate has a flexible on demand bus service. Cheryl rang yesterday to let them know we needed to be picked up at the meeting point at 8:30am. It works well: the little green bus scoots around stopping at designated meeting points. There are about 10 times more meeting points than conventional bus stops so it's never far to walk. Fifteen minutes before the bus is due at our meeting point a text message is sent to Cheryl's phone confirming our booking. She responds in the affirmative and we leave the house.

Smartcards for travellers

I board the bus and swipe my smart traveller card. This cool new technology allows me to travel using any public transport including taxis. It also acts as a toll card for the Gateway Bridge, for a few high tech car parks in the city and of course on any toll road in Australia. All rolled into one card – my driver licence, and it's linked to my savings account so I can also use it to buy the paper or stamps and in vending machines. It's also helpful for the security interface in my truck.

Integrated passenger transport

The passenger information screen in the bus shows the timetable of the next train to the city stating it will arrive in 10 minutes. Luckily, software systems in the transport management centre and hardware systems at the train station monitor the bus's location (taken from global positioning systems) and coordinate between bus and rail operators. Boarding the train is just as easy with a swipe of the smart traveller card. Integrated ticketing has given travellers easy access to all passenger transport and fares are easy to calculate within and across zones.

The train gets me to Central in 30 minutes. The passenger information screen in the carriage indicates current travel time and the estimated arrival time at Central. Despite leaving two minutes late, we are running right to schedule.

ITS for vulnerable road users

The smart pedestrian crossings in the city respond to our presence on the footpath, making crossing the road safer and more convenient. There are quite a number of these around town particularly up near the hospital. Along with piezometric sensors in the footpath, this one uses infrared radar technology to detect the pedestrians on the crossing. The walk time can be extended to make sure that we have enough time to safely cross the street, which is also great for the oldies. This is just one example of how ITS has had to develop to respond to an aging population.

We get up to the hospital in good time and I spend most of the day with dad. He is in good spirits, despite his close call, and is being well looked after in the hospital. He isn't thrilled with the hospital food though, and we hatched a cunning plan to smuggle dad a pizza.

Real time traveller information enroute

At the end of the day, I decide to catch a bus directly home. Once onboard the bus, I am alerted to a change in the regular bus route. This is due to an annual street parade that has blocked off a number of streets enroute. The passenger information screen onboard shows the changed course and the estimated increase in travel time. From the bus window I notice similar information displayed on the dashboard of one of those new European sports cars. I figure that means I'm travelling in style too!

New in-vehicle technology

I also notice that most cars on the road are fitted with active safety features. The government is allowing limited trials of some cars that have additional safety features and extra gadgets. Some have night vision sensors, external airbags to protect pedestrians or sensors to prevent rear end collisions and lane deviation. All very valuable contributions, if they keep the road toll going down as it is!

It is great to have a bit of time off and by all accounts Dad's prognosis is better than first thought. While it was all a bit of a shock at first, the technology available has enabled the transport system to respond to unexpected events and made it easier for me to reschedule my activities. The future is certainly looking bright for Queenslanders!

Executive Summary

The Queensland Government promotes Queensland as "The Smart State". To support this, the Transport Portfolio needs to be an informed participant in the Intelligent Transport Systems (ITS) industry. Understanding the diverse needs of Queensland and planning for strategic ITS deployment can assist the Transport Portfolio to meet its vision:

Contributing to government outcomes through consistent, coherent leadership in the development and management of innovative transport solutions in Queensland that connect people, goods and services.

This Strategy is based on a series of ITS User Services and ITS Enabling Issues developed specifically for the Queensland environment and for the multimodal nature of the Strategy's vision. As ITS systems operate across jurisdictional boundaries, the Strategy also focuses on the national agenda particularly in the areas of a national architecture and standards for system interoperability. The key aims of the strategy are:

AIM 1: Contribute positively to a safe, integrated, efficient and sustainable multimodal transport system

Ways that this can be achieved include:

- Improved cooperation among traffic management agencies for optimised use of existing and planned ITS systems for Queensland. This includes the sharing of communications infrastructure and field equipment. For metropolitan Brisbane, a central Traffic Management Centre is proposed. This could be expanded for the whole south east Queensland region.
- Improved coordination with emergency services and police for quicker response to incidents and better public safety and security in metropolitan, rural, regional and remote parts of Queensland. This includes the use of mobile data and technologies to facilitate dispatch, response and movement through the network (for example, computer aided dispatch (CAD), emergency vehicle priority systems and the mobile data strategy).
- Continued development of the world class Ship Reporting System (SRS) and integration of this system with the Vessel Traffic Services (VTS) system for sea ports.

AIM 2: Provide leadership and guidance to advance the application and interoperability of intelligent transport systems across Queensland, nationally and internationally

Examples of Transport Portfolio projects in this area include:

- Continued development of smartcard technology (including a new driver licence for Queensland), tolling, and integrated ticketing consistently across the State and where appropriate nationally.
- Improvement of the Transport Portfolio's capacity to evaluate and prioritise projects that involve ITS.
- Improved information for travellers through variable message signs (VMS) in rural and remote areas, for example, providing information on flooding and heavy vehicle occupancy on steep grades.
- Coordinating real time information, for example, at rail/bus interfaces to improve the efficiency of passenger transport systems.

AIM 3: Influence the current transport and land use planning process to embrace the benefits of ITS including assessment, development, implementation and evaluation of ITS in the Transport Portfolio

For example:

- Strategic deployment of road based ITS devices and communications infrastructure across Queensland, based on a consistent prioritisation process.
- Development of a policy and regulatory environment that facilitates efficient interaction with the freight industry and exploits advances in in-vehicle technology arising from international research. This includes the principles of the Intelligent Access Project (IAP) and the Intelligent Vehicle Initiative (IVI).

AIM 4: Influence the national ITS agenda in the area of standards and architecture

Ways this can be achieved include:

- Sharing learnings from the mapping of existing ITS applications in Queensland and participating in national discussions regarding the mandating of existing platforms and interoperability requirements.
- Enhancing people's access to quality passenger transport information including participation in the national single public transport information phone number project to extend the capacity and profile of TransInfo.

AIM 5: Cooperate internationally to exploit the results of ITS research

Where such opportunities exist, the portfolio may choose to:

- Explore opportunities for ITS research in Queensland and international cooperation.
- Continue the portfolio's participation in international conferences and research to understand international ITS trends.

Achieving these aims will require extensive cooperation and coordination among various stakeholders in the public and private sectors. This document presents the benefits of ITS and the processes by which these benefits can be attained through the Transport Portfolio's strategic deployment of ITS. Due to the burgeoning nature of the ITS industry and the cooperative environment needed for its successful deployment, the Strategy's focus areas to enable this success include:

Relationships

- For example, establishment of an ITS community through better cooperation among the Transport Portfolio, other state government departments, other levels of government and the private and research sectors.

Capability

- For example, improved cooperation in relation to research and innovation. This includes examining the role government can play to support and benefit from international research and further such research in Queensland.
- Another example would be developing an understanding of workforce capability to meet the challenges of deployment, and skilling staff accordingly.

A functional modelling (mapping) exercise has been undertaken concurrently with the development of this Strategy. This exercise mapped the functionality of all ITS systems currently used by the Transport Portfolio and forms the basis for a compliance mechanism for future system functionality and interoperability.

QUEENSLAND – THE SMART STATE

"Our aim is to develop Queensland as an Asia-Pacific hub for the new industries of the 21st Century – industries such as biotechnology, information technology, nanotechnology and communication technology."

Hon Peter Beattie
Premier of Queensland
2005

What are Intelligent Transport Systems?

Intelligent Transport Systems Australia (ITS Australia) defines ITS as:

"The application of modern computer and communications technologies to transport systems to increase efficiency, reduce pollution and other environmental effects of transport and to increase the safety of the travelling public."

Real time passenger information: Bus/Rail line, Gold Coast.

The transport sector has been using intelligent systems for some time. Computer aided traffic management systems including traffic signals and VMS are used to manage road transport. In the rail, maritime and air transport sectors, Global Positioning Systems (GPS), radar, telemetry and GSM mobile phone technologies have been used to monitor the movement of trains, ships and aircraft. These types of systems are increasingly being harnessed by the road transport sector to improve efficiency and safety.

An example in the road sector is traffic signal coordination to facilitate the movement of emergency vehicles through the network. These systems reduce response times to crashes, improving safety and saving lives. Opportunities also include the monitoring of road freight to improve the efficiency of freight interchanges and the safety of the transport network for both users and the environment.

ITS components can be grouped into the following three elements:

Intelligent infrastructure	for example, traffic signals, flood and adverse weather monitors, VMS to alert road users of hazards ahead.
Intelligent vehicles	for example, automatic crash notification, intelligent speed adaptation, reverse and forward collision warning, route guidance systems, alcohol ignition interlocks, lane departure warning, adaptive headlights.
Communication and control systems	generally the most critical and most expensive component of ITS deployment. Includes existing voice and data communications infrastructure both wired and wireless.

Successful combinations of these technologies will meet transport challenges and address Queensland Government priorities. These priorities are shown in Figure 3 on page 17 of this document.

Strategic Challenges for the transport Portfolio

In order to fully embrace ITS and its role in the future of transport management, the strategic challenges to the Transport Portfolio must be understood.

These challenges are listed below.

The proliferation of high tech transport solutions currently available and under development compels the Transport Portfolio to be an informed participant in the ITS industry.

a. This challenge also provides many opportunities for driving Queensland's "The Smart State" agenda. Research undertaken across the Information and Communication Technology Sector, including e-security and mobile technology will make significant contributions to the future of the transport sector.

By 2015, the Australian freight task will double.

a. Technology must be harnessed to increase the Portfolio's capacity to manage the growing compliance and enforcement task. This requires coordination within the Portfolio and cooperation with the freight industry.

b. Increased freight movement will increase pressure on ports and intermodal interchanges and the transport system generally. The Portfolio must encourage the use of technology to support Queensland's globally competitive freight industry.

c. There is the potential for increased environmental damage and damage to road infrastructure. ITS based solutions can monitor the content and weight of freight and the location of freight vehicles in real time. This in turn can improve road asset performance and assist in responses to incidents of environmental concern.

Population distribution projections for Queensland and aging trends in western countries are set to put pressure on the limited and aging infrastructure, particularly in the south east of the State.

a. Changing work, travel and consumer patterns require integrated transport technologies consistent with general technology trends to support mobility and access. This includes not only the movement of workers to and from the workplace but the increasing demand by both employers and employees to have mobile access to corporate and customer information on the road.

b. The community is becoming increasingly active in government decision making and is demanding increased personal safety, better security and decreases in the number and severity of road crashes.

c. Vehicle manufacturers and road safety researchers need to work together to better understand the impact of new and emerging ITS on drivers and other road users. With technology being introduced gradually into the general vehicle fleet, drivers may experience difficulty changing between new and older vehicles, a common occurrence in some occupations.

d. With suitable awareness raising, ITS can be seen as enabling technology to support other Portfolio strategies and objectives. It is important that this potential is communicated to other State Government agencies – in particular, Queensland Police Service, Emergency Services, Queensland Rail, State Development and Tourism Queensland – to ensure opportunities and synergies are realised.

The challenges of freight movement and changing population require optimal use of transport infrastructure (existing and planned, public and private) and improved management and operation of the transport network.

a. The Transport Portfolio will need to consider the use of ITS generated data in a broader context to understand and improve network performance and inform travellers.

b. There must be appropriate investment in new transport infrastructure and technology that will increase the life of existing assets and optimise network operation.

c. Innovative funding arrangements, for example Public Private Partnerships (PPP) are available for new transport technology infrastructure and will assist the Transport Portfolio to meet the needs of current and future generations.

Environmental responsibility and Smart Travel Choices (STC)

a. Minimise the impact of transport on the environment for current and future generations. ITS must be deployed to influence mode choice and to take advantages of the benefits ITS can bring to public transport.

b. Influence travel mode choice while maintaining Queenslanders' lifestyle of comfort and convenience.

c. Travellers are demanding improved service delivery, such as more accurate traveller information and coordination of rail, bus and private sector transport providers.

Why an ITS Strategy

The objective of the multimodal ITS Strategy for Queensland is to:

Maximise the potential benefits of ITS in Queensland, across all surface transport modes, to further Queensland Government Priorities and the strategic priorities of the Transport Portfolio.*

* See page 17 for Queensland Governent priorities.

The Queensland Government's commitment to being Australia's Smart State is well known throughout Australia and internationally. The Smart State agenda aims to position Queensland as a leader in innovation, knowledge creation, education and research and development; building on the State's considerable human and natural resources.

While Queensland Transport and Main Roads are focused on ITS solutions for meeting strategic transport challenges, ITS deployment will provide many opportunities to further the Smart State objectives. This Strategy will enable the Transport Portfolio to contribute to local ICT industry development and participate in furthering the State's research agenda.

Employing a strategic approach in conjunction with an implementation program will:

- provide a comprehensive, practical planning framework for effective deployment of ITS in Queensland. This will allow for better integration and interoperability of existing and planned ITS technologies into current resource allocation and funding programs.
- ensure coordination of programs and initiatives that are currently underway through:
  a. prioritisation of stakeholders needs and potential benefits.
  b. providing a repeatable method to measure performance of projects and systems.
  c. ensuring the task is kept manageable with outcomes in a realistic timeframe.
- position Queensland's road and transport agencies to participate more effectively in:
  a. national discussions on system interoperability, a national architecture and national ITS standards.
  b. international arrangements (forums and partnerships) to bring innovation and the results of leading edge research into Queensland, encouraging local knowledge based industry development.

Variable message sign: advising motorists of expected travel times.

Overview of transport and how ITS can help

The transport system in Queensland

Geographically Queensland is the second largest state in Australia, covering an area of approximately 1 727 000 km2 (over twice the area of New South Wales or over seven and a half times the area of Victoria), a coastline of 7400km, with a human population of 3 700 000. Almost 65% of the population live in the south east corner of the State. The population in south east Queensland is predicted to increase from 2.4 million people to 3.7 million in the next 10 years.[1]

The remainder of the state is more sparsely populated and is the source of primary production and mining - key industries in the State's economy. The freight task is currently 29 billion tonne kilometres per year, set to double in the next 15 years, 90% of which is moved by road. Brisbane is also a key seaport for the rest of the country with over 400 000 containers moving through the Port of Brisbane each year. The ports of Gladstone and Hay Point are larger than the Port of Brisbane, shipping coal, grain and other bulk commodities.

Tourism contributes approximately $6 billion to the Queensland economy annually with 80% of all visitors using a motor vehicle. In addition to the vast distances and remote locations that attract travellers, the weather conditions can be extreme with drought, flooding and road closures common occurrences.

The diversity of transport needs across the State provide a variety of opportunities and challenges for ITS.

Issues highlighted in consultation

To identify ITS opportunities and issues associated with transport in Queensland, extensive consultation was undertaken across the State.

General issues

Issues raised include:

- The setting of priorities for the roll out of ITS devices: "How will the priorities for the development and deployment of ITS be determined?"
- There is a need to fully understand and evaluate the benefits of ITS relative to the corporate objectives of the Transport Portfolio before they become widely deployed. These benefits must include contribution to goals/targets in road safety, travel demand management and to improved efficiency of the movement of people and freight.

Technology based issues

- There is a lack of standards and interoperability of ITS.
- System and data ownership and responsibilities need to be clear to maintain connectivity of independent systems.
- Liability issues associated with ITS deployment need to be clarified. For example, who is liable when a traveller is involved in a crash after following advice provided by an ITS application?
- New skills are required to understand and fully embrace this technology.
- Clear guidance is needed to enable agencies to regulate systems as appropriate, particularly in the area of motor vehicle innovation.
- The Portfolio may need to influence the wider deployment of ITS applications shown to be beneficial to road safety.

Population based issues

- Congestion during peak periods and around incidents is of particular concern in regional centres where there may be no alternative routes.
- Emergency vehicle response times need to be improved.
- The provision of accurate traveller information to the community as well as specific information for subscriber users needs to be investigated.
- ITS based passenger transport information systems must cater for regular users, occasional users and tourists.
- The sense of personal safety using public transport has always been less than that of the private car. ITS must be used to increase patronage.
- Users, particularly older drivers, may be overloaded by systems that are too complicated to use.

- Travellers need reliable real time information on road conditions during peak periods and when incidents occur (including road closures due to flooding). Information used to divert traffic around incidents needs to be accurate and timely.
- Privacy concerns of the community need to be understood and addressed.

Freight-specific issues

- The current log books system is time consuming and inaccurate. Does ITS offer an alternative?

Environmentally-specific issues

- ITS must be evaluated in terms of environmental sustainability.

Benefits of ITS

Intelligent transport systems have been used across all transport modes to improve safety and security. Traditionally, particularly in the aviation and maritime sectors, these systems have provided improved response times to crashes. Recent developments in vehicle-based technologies are aimed at assisting the driving task and intervening in a pre-crash setting. Such systems including intelligent speed adaptation and lane deviation warning are providing safety benefits to road users.

Another motivator for ITS development and deployment around the world has been driven by a need to do more with less in a climate of rapid technological advancement. While traffic volumes have increased in cities, building more roads is becoming less viable for governments and less acceptable to the community, particularly if technology is available to meet these challenges. This is increasingly the case in south east Queensland. ITS can bring a number of benefits to improve the operation of the road network, postponing road widening and additional construction. These operational benefits can flow to the freight, passenger transport and tourism industries and increase the safety of the road environment.

In rural and remote parts of Queensland, traditional approaches to development, including road building, is necessary and more viable in many cases, than deploying extensive ITS systems where the benefits have not been justified to date. However, ITS can also provide clear benefits to travellers and freight operators in these remote locations particularly for flood warning and emergency distress call and response. The decision to build traditional road infrastructure is based on cost benefit analysis processes that favour traditional construction methods over ITS technology. An objective of this Strategy addresses the need to modify this existing cost benefit analysis process to include the less tangible benefits of ITS.

The benefits of ITS are described briefly here.

Social

Improved transport safety

The most significant social issue associated with transport is the safety of system users. According to the Australian Bureau of Transport Economics, road crashes in Australia cost the community $15 billion per year. ITS can offer in-vehicle and infrastructure based active and passive applications to improve road safety.

A variety of in-vehicle devices are being developed and tested by vehicle manufacturers and research organisations. While such devices promise improvements to the driving task, their functional benefits must out-weigh any potential distraction to the driver.

CASE STUDY: REEFREP

Ship Reporting System

The Great Barrier Reef is World Heritage Listed and is the world's largest coral reef ecosystem. To ensure the long-term survival of the reef, and to enhance navigational safety, the Ship Reporting System (SRS) was established in 1997, a joint initiative by Queensland Transport and the Australian Maritime Safety Authority (AMSA). Three core modules enable SRS to gather, process and display essential information on shipping operations in the Great Barrier Reef (GBR) zone.

The SRS is one of the world's first mandatory ship reporting systems for vessels 50 metres or greater, all oil tankers, liquefied gas carriers, chemical tankers and ships engaged in towing or pushing where either ship falls into the above categories, or where the length of the tow exceeds 150 metres. The SRS system is operated by Queensland Transport from REEFCENTRE at Hay Point near Mackay. The system, currently radar based, increases maritime safety and enhances marine environment protection and response within the GBR area. The shipping data gathered is used to refine the risk profile for shipping on the Queensland coast, which assists in marine incident response planning.

Infrastructure based ITS that actively improve road safety include intelligent road crossings for pedestrian and bicycle riders and VMS that warn motorists of upcoming hazards.

Automatic Crash Notification (ACN) is a vehicle based system that is providing improved responses to crashes. These ACN systems, operated through third party providers, transmit a distress call to the provider in the event of a crash. A voice based confirmation is obtained, the location of the vehicle is determined using GPS and appropriate emergency response dispatched.

Improved mobility

ITS can contribute to an accessible, affordable, equitable and reliable transport system that incorporates continual performance improvements and is responsive to community needs.

Passenger transport that is more responsive to community needs

ITS that accurately predicts the arrival of buses, improves personal safety and encourages passenger transport patronage can help jurisdictions meet public transport mode share targets particularly if the benefits of ITS are experenced in the public transport sector before wider distribution in private vehicles.

Better coordination of the movement of freight vehicles through regional centres

Concerns with noisy air braking and pollution caused by freight vehicle movement through regional centres can be alleviated with better use of intelligent traffic signal coordination.

Economic

Knowledge based industry development

ITS development for local conditions will require particular local skills. Strategic deployment of ITS across the state will bring a boost to Queensland's knowledge based industries supporting the continued success of the Smart State agenda.

Freight movement and management

- ITS that improves the movement and management of freight will benefit industries that rely on supply chains to develop and maintain a competitive edge. This is also the case for tourism.
- Efficient freight management will assist in the timeliness of light commercial vehicle deliveries - an element of the growing Internet shopping industry.
- ITS can be used to track and coordinate freight and vehicles to improve the efficiency of intermodal freight transfers.

Efficient management of traffic

- Using ITS to manage congestion can postpone road widening and improve overall asset performance providing economic benefit to road authorities and the community.
- ITS can significantly increase workforce mobility. The growth of the Queensland economy depends on the capacity of business and government to work together and deal with the challenges posed by the dynamics of the world economy. A more reliable transport network moving people in a more efficient way can support this. The capacity to predict travel time and the ability to create a mobile office environment on the road keeps Queensland business competitive.
- ITS systems can provide important real time information to the tourism industry, particularly road closures and other weather related travel issues. This improves the professionalism of the industry and allows for the execution of alternative arrangements in a timely manner.

Environment

Studies have shown ITS can have a positive impact on the environment through:

More efficient traffic movement

- This includes the reduction of speed limits on some roads during congested periods to smooth traffic movement meaning less congestion, reduced air pollution and less fuel consumption and improved safety.
- Pre-trip traffic condition information can influence mode and route choices, reducing private vehicle use at peak times.
- The use of smartcards and other means of electronic fare collection has seen significant increases in passenger transport patronage in other places.
- Electronic toll collection improves the efficiency of toll payment and reduces emissions at toll plazas.

Management of the freight compliance task

ITS can be used to monitor dangerous goods movement. This may keep vehicles carrying freight that may be environmentally damaging out of environmentally significant areas.

Queensland's approach to managing ITS

Strategic Framework

The strategic framework for the multimodal ITS Strategy for Queensland is illustrated here.

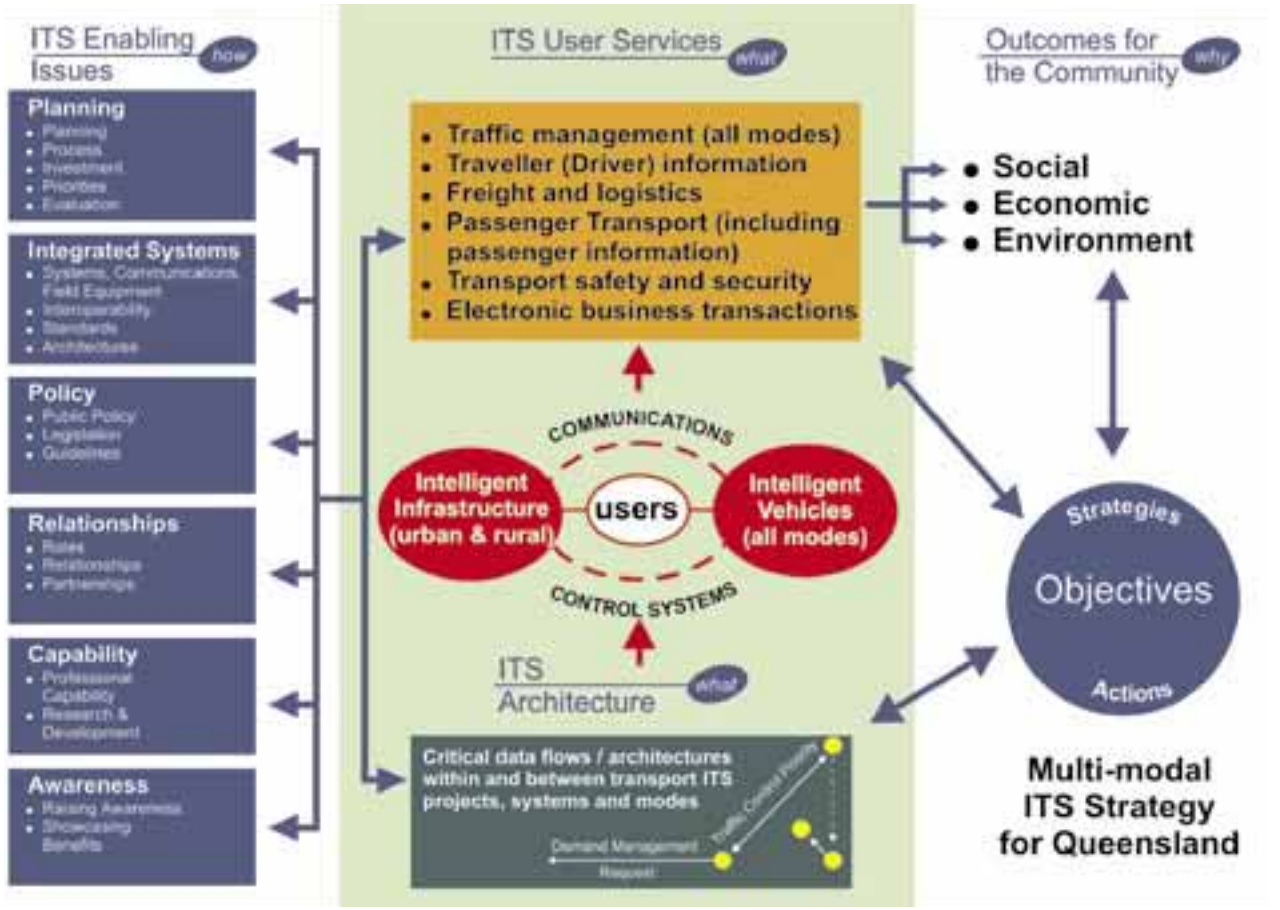

Figure 1: Framework for Multi-model ITS Strategy for Queensland

The four principal themes for the development of the Strategy's objectives are (anticlockwise from top right):

- Outcomes for the Community
- ITS User Services
- ITS Enabling Issues
- ITS Architecture

A brief description of these themes follows.

Outcomes for the community

These high level outcomes aim to make Queensland's transport network safe, efficient, effective, affordable, integrated and environmentally friendly.

The three outcomes areas are:

- Social - including safety, security, mobility and liveability;
- Economic - improved efficiency and effectiveness of the transport system; and
- Environmental - minimising environmental impact.

ITS User Services

The services provided or enhanced by ITS are grouped in the following six areas. They are referred to as User Services throughout this document.

- Traffic Management (all modes)
- Traveller (Driver) Information
- Freight, Logistics and Heavy Vehicle Management
- Passenger Transport (Passenger Information)
- Transport Safety and In-Vehicle Control
- Electronic Business Transactions

Each User Service is described briefly here.

Traffic management

An advanced traffic management system consists of a number of support systems assisting the monitoring and controlling of transport networks or vessel movements. This is achieved using systems that improve communication, monitoring, data analysis and management.

In the road network such systems are becoming more commonplace particularly on urban and interurban freeways. The aims are to improve traffic flow and travel safety, inform drivers of delays and improve incident response. The data generated through traffic management systems can be used in future systems to provide information directly to vehicles (private or public), influencing mode choice.

Such technology in the transport system, irrespective of mode (land, sea or air), improves safety and security, reduces congestion and improves response to incidents. In the maritime setting, for example, ITS has reduced groundings and other maritime incidents. If such an incident does occur, the system enables rapid targeted response.

Traveller information

The ultimate objective of this user service is to provide drivers of both private and commercial vehicles with real time traffic information. Such information would include:

- pre-trip and enroute information for all transport modes;
- traffic data (speed and travel times);
- traffic conditions (crashes, incidents, construction work, major events); and
- weather conditions (rain, fog).

Currently this information is available on websites and via public radio broadcasts. In the future, information on road conditions and the most suitable travel mode for these conditions may be provided by subscription to mobile phones or other remote devices.

Freight and logistics

Transport and logistics companies increasingly use ITS communications and fleet management technology to track goods. These systems are extremely valuable for monitoring goods across modes and across jurisdictional boundaries.

The key opportunities for ITS in the freight industry are:

- Queensland Transport's development, testing and approval of freight efficient and innovative vehicles improves safety and transport efficiency. Such activities maintain QT's lead in the understanding and regulation of heavy vehicles.
- the provision of real time traffic information to the freight industry to improve intermodal transfers.
- traffic signal management systems that facilitate priority movement of freight vehicles through rural centres at night to reduce noise and damage to roads.

Passenger transport information

The use of ITS in passenger transport can improve conditions for all road users. ITS systems can monitor the exact locations of buses as is currently done for trains and notify passengers of accurate arrival times. Passenger transport information can be provided through a greater variety of media providing more choices when planning a trip.

Integrated ticketing using smartcard technology improves services to passengers and increases patronage. The integrated ticketing system for south east Queensland will increase the use of existing services and infrastructure. This system can also be used to monitor the mechanical status of vehicles including safety equipment.

ITS are endeavouring to improve the personal safety and security of passengers which will also encourage patronage.

Transport Safety and Security

ITS can enhance road safety initiatives developed by Queensland Transport and the Queensland Police Service. Road user safety can be improved by intelligent in-vehicle technologies that assist the driving task and support policing. Infrastructure based systems that provide a clear picture of the operation of the road network can alleviate congestion around crashes, facilitating emergency vehicle access and reducing secondary crashes. Other road based technology can target aberrant driver behaviour, for example, speed and red light cameras.

Vehicle manufacturers and their markets drive the development of vehicle based safety and control technologies. The government and research sectors objectively assess the safety benefits of these devices. This may result in either regulation or encouragement of particular devices.

As well as improving transport safety, ITS play a significant role in the security of goods and the personal safety of individuals. The road network is an invaluable component in emergency response to both natural and human caused threats and disasters. ITS can improve the capacity of the road network to support emergency response agencies.

Electronic Business

The collection of tolls and fares has been shifting towards cashless systems for some time. There are also trends towards interoperability of these systems.

Examples of potential electronic business application include the provison of flight arrival and deaprture detail, road and traffic conditions and passenger transport information.

These applications can be provided by the Internet, Short Message Service (SMS) and or mobile telephone services.

The potential for new electronic business transactions is limited only by the imagination of service providers and acceptance by the public.

Real time passenger information – South East Busway

ITS Enabling Issues

Enabling issues defined in this Strategy facilitate the successful integration of ITS in the daily operation and management of the Transport Portfolio's business. It has been observed that the difficult issues in ITS are not solely technical, but also social and institutional.

The ITS Enabling Issues are:

- Planning - including processes, investment, priority setting and evaluation of ITS.
- Policy - ensuring appropriate public policy and legislation is in place.
- Integrating Systems - issues of interoperability, integration, standards and architecture.
- Relationships - understanding the various roles, relationships and partnerships with stakeholders.
- Capability - ensuring appropriate capacity and professional capability is available within the portfolio and research and development is encouraged.
- Awareness - raising awareness, and showcasing benefits.

Planning

ITS are being used increasingly to help address a wide range of transport challenges. However, consideration of ITS solutions is not yet a routine part of transport planning. The potential benefits of ITS will only be realised if ITS is routinely considered, in an integrated and coordinated way, at all levels of the transport planning process.

At this stage in Queensland, there is no consistent methodology for evaluating and comparing ITS components of transport projects with other elements. With the trend away from capital intensive construction projects towards better management of the transport network (ITS devices), there is a need to identify and compare the costs and benefits of ITS deployment through an evaluation process that considers the less tangible operational benefits of ITS.

Integrating systems

Greater cooperation within and among transport agencies is needed to meet growing community expectations of a coordinated transport network.

A modelling project has been undertaken in conjunction with the development of this strategy. The modelling provides details of the functionality and platforms of all existing ITS systems in use across the multimodal transport environment. This work will form the basis for a coordinated approach to future ITS deployment and expansion.

Policy

A policy environment that is flexible, responsive to change and encourages industry innovation.

Responding to community concerns regarding ITS and privacy.

Clarifying legal issues such as liability from equipment malfunctioning or from inaccurate information, minimising copyright and patent related violation (intellectual property).

Relationships

Queensland Transport and Main Roads have an opportunity to lead, coordinate and accelerate the application of ITS technology across Queensland. The Transport Portfolio can bring stakeholders together and focus attention on issues and opportunities.

Building partnerships and overcoming institutional barriers are among the most important actions required to realise the potential benefits of ITS. Statewide and regional ITS deployment requires communication and coordination among the agencies that are charged with planning, managing and operating the transport network.

Capability

The deployment of ITS systems requires transport professionals who can deal effectively with a range of rapidly developing ITS technologies and services. It requires a range of technical capabilities, such as systems engineering, electronics and communications, as well as traffic engineering, transport planning, public policy, research and development, and behavioural science skills. Staff training in this field needs to be considered by the Transport Portfolio.

Research and development is essential for transforming concepts into viable solutions. The private, public and research sectors must work in a complementary way to maximise research opportunities and benefits. This is particularly the case with international research. Vehicle manufacturers and governments in Europe and the United States are investing heavily in ITS research. The Portfolio must position itself to make the most of the results of this research.

Awareness

Raising awareness and showcasing benefits communicates the positive results realised through the use of ITS applications. By understanding the benefits of ITS, senior executives, transport planners, policy and technical staff can compare ITS to other traditional transport solutions. Raising the awareness of the benefits of ITS can lead to cooperative solutions across jurisdictions and agencies.

ITS Architecture

The development of the national ITS architecture is the vital component in acheiving effective coordination and facilitation of implementation of ITS systems. Queensland has modeled the functionalities and communication systems of all ITS systems currently deployed across the Queensland Transport Portfolio.

This was undertaken concurrently with the development of the Strategy and a number of objectives have been shaped by the results of this exercise.

The Strategy carries a recommendation to continue this exercise for all ITS systems currently being developed in Queensland.

The resulting framework can form the basis for an ITS architecture, contributing to national initiatives in this area. The "framework" does not prescribe specific technologies, rather it encourages innovation and competition among developers and designers within a set of guidelines to ensure compatibility.

CASE STUDY: TRANSINFO

Telephone and web-based passenger information for south east Queensland.

This system has been functional in south east Queensland since August 1993. It provides integrated public transport information on buses, ferries and trains (excluding Traveltrain) in south east Queensland, from Gympie and the Sunshine Coast in the north to the Gold Coast and Kingscliff in the south, and west to Toowoomba including the greater Brisbane area and Ipswich.

The telephone service provides callers with detailed information on timetables, routes, stop locations, fares, connections, special events and other service provider information.

The web based TransInfo Journey Planner and timetable information is maintained on a regular basis, with updates occurring at least once a week. Queensland Transport is continually striving to improve the web site to allow users easier access to passenger transport information.

The speech activated interactive voice recognition component of the system allows 24 by 7 access to simple timetable information and is improving services to users and supporting mode shift. This system provides social, environmental and economic benefits by improving access to public transport information.

Strategy objectives

As stated earlier, the overall objective of the Multimodal ITS Strategy for Queensland is to:

Maximise the potential benefits of ITS in Queensland, across all surface transport modes, to further Queensland Government Priorities and the strategic priorities of the Transport Portfolio.

In response to the strategic challenges discussed above and in order to meet this objective, the Transport Portfolio is committed to the following aims:

- Provide leadership and guidance to advance the application and interoperability of intelligent transport systems across Queensland, nationally and internationally.
- Contribute positively to a safe, integrated, efficient and sustainable multimodal transport system.
- Influence the current transport and land use planning process to embrace the benefits of ITS.

This requires extensive cooperation and coordination among various stakeholders in the public and private sectors. Queensland is also in a position to influence the national ITS agenda, particularly in the areas of standards and architecture. There is also great benefit to be gained through international cooperation to exploit the results of ITS research.

The supporting objectives of this strategy assist the Portfolio to reach these aims. The objectives are listed here in summary. The strategies and actions for achieving these objectives are provided in the ITS Implementation program supplementary to this Strategy.

The User Services and Enabling Issues based Objectives of this Strategy

The objectives of this strategy are presented in the following groups as described above:

- ITS User Services
- ITS Enabling Issues

Note, objectives have not been developed specifically in relation to ITS Architecture. Rather, the results of the functional modelling project have informed a number of objectives in the other groups.

Each objective supports the outcome areas (social, economic and environmental).

ITS User Services

Traffic Management

Road Transport

- Optimise traffic flow and safety within a total transport context.
- Maximise the utilisation of ITS technology in the collection of transport data and information.
- Ensure that ITS deployment programmes embrace the principles of Smart Travel Choices.

Maritime Transport

- Develop International best practice and State wide consistency in port procedures for VTS requirements.
- Improve integration between port and coastal ship movements through the Ship Reporting System (SRS) and Vessel Traffic Services (VTS) within ports.
- Strive for continuous improvement in systems and procedures to ensure Vessel Traffic Management (VTM) remains abreast of international guidelines.

Traveller Information

- Improve guidance and information to drivers.

Freight, Logistics and Heavy Vehicle Management

- Provide ITS infrastructure to support internationally competitive supply chains and "just in time" delivery.
- Use ITS to optimise the efficiency, safety and security of freight movement while minimising impact on infrastructure.
- Improve inter-modal links by improving the capability for coordinated cargo tracking through the total logistics chain.

Passenger Transport

Information

- Improve the integration of passenger transport modes using ITS.
- Enhance people's access to quality passenger transport information.
- Enhance safety on passenger transport.
- Research and apply appropriate passenger transport innovation and technology.

Transport Safety and Security

- Reduce the crash risk and improve the behaviour of on water and on road operators and drivers.
- Improve the transport system's capacity to support responses to natural and human caused threats and disasters.

Electronic Business Transactions

- Better control of user access to the transport network.
- Maximise the efficient use of transport based smartcards.

ITS Enabling Issues

Planning

- Integrate ITS into transport planning process.
- Improve the Transport Portfolio's capacity to prioritise projects that involve ITS.

Policy

- Develop a transport portfolio ITS policy and procedures manual to assist staff to coordinate deployment of ITS across Queensland.
- Establish a policy environment that responds to the challenges of research and innovation and attracts research and development to Queensland.

QT's research and development of freight efficient vehicles supports the growing freight task.

Integrating Systems

- Understand functionality and interactions of existing ITS applications within the Transport Portfolio.
- Create an overall ITS system framework to facilitate rational development of future ITS systems.
- Contribute to the development of a National ITS Architecture.
- Develop a central transport management centre to integrate traffic management systems to ensure consistency of services across the full transport network.

Relationships

- Lead the creation of a culture that continues to reduce institutional barriers among ITS stakeholders

Capability

- Develop a vibrant highly skilled ITS workforce.
- Undertake research and development in priority ITS.

Awareness

- Communicate the significant contribution ITS can make in achieving safety, efficiency, liveability and environmental outcomes.

Implementing the Strategy

This Strategy will facilitate the consistent deployment of technology throughout Queensland's transport sector. The transport portfolio consisting of Queensland Transport and Main Roads are charged with the responsibility of implementing the ITS Strategy.

This section outlines the Portfolio's approach to implementation including issues such as responsibilities, performance monitoring, funding, steering arrangements and consultation.

Positioning the ITS Strategy

The following diagram illustrates the position of the ITS Strategy in relation to the other strategic documents of Queensland Transport, Main Roads and the national ITS Strategy (e-transport). This strategy is seen as enabling and enhancing the successful implementation of other strategic objectives of the Transport Portfolio.

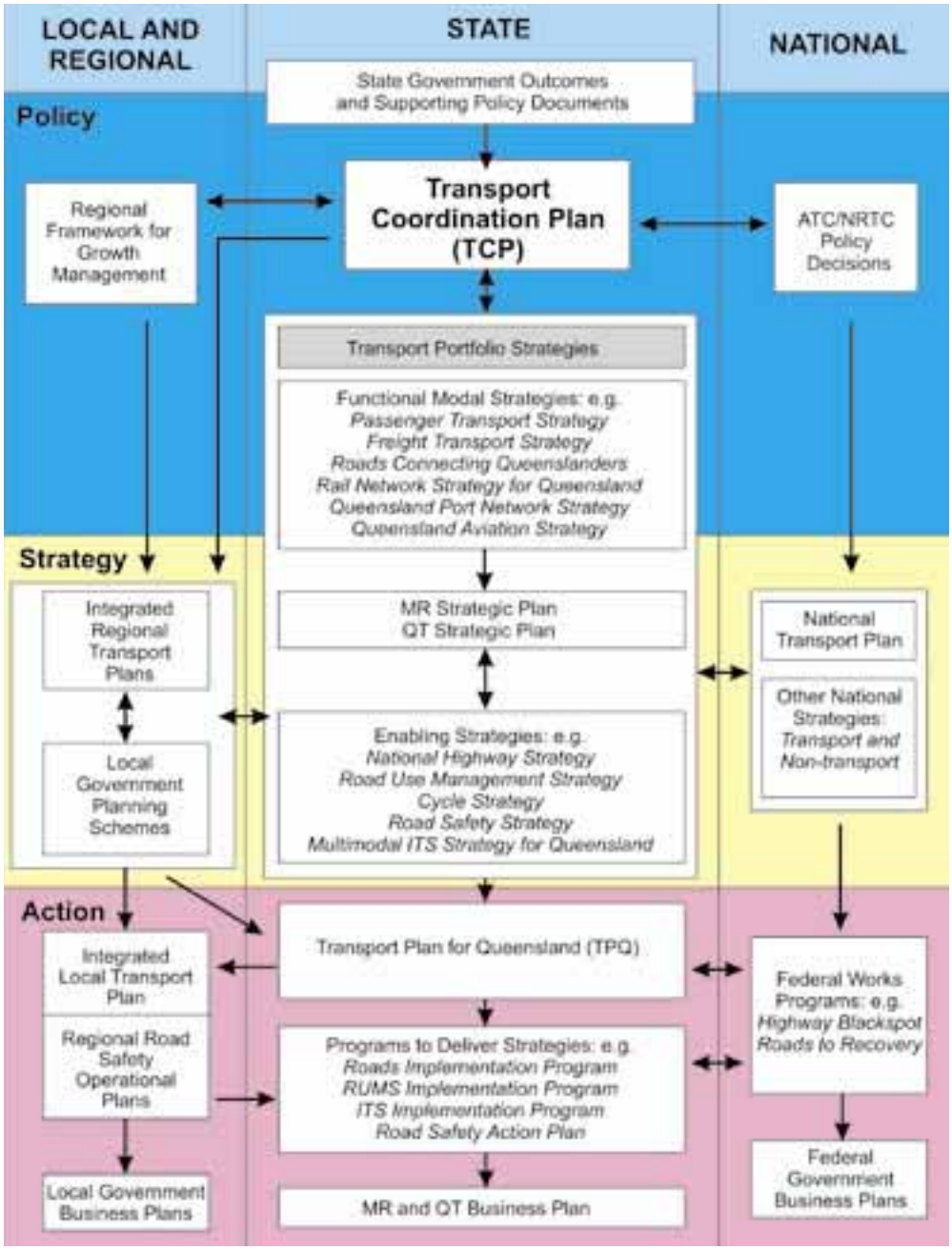

Figure 2: Multi-model Strategy – Links to Other Strategies and Plans

Links to other state government projects and strategies

The multimodal ITS Strategy for Queensland, while supporting the objectives and priorities of the Transport Portfolio, can make a significant contribution to a number of other state government directions, strategies and priorities. There are opportunities for the ITS Strategy to support and coordinate with other government departments including The Queensland Police Service, Emergency Services, State Development, Public works, Environmental Protection Agency and Department of Natural Resources and Mines.

Queensland's future success is driven by opportunities in traditional and emerging knowledge based industries. The Smart State vision focuses on ensuring Queensland is a leading participant in the emerging technologies such as information technology and communications. At the same time, new smart solutions are being applied in traditional industries to ensure that they remain competitive in the marketplace.

The following diagram shows the multimodal ITS Strategy for Queensland supporting the Smart State philosophy and linking with other key state government ICT strategies and plans.

National ITS Projects

This document also presents a plan for Queensland's participation in the development of a national ITS architecture and standards for deployment of systems as specified in the national ITS strategy, e-transport.

The Strategy has been developed with an understanding of national ITS issues as expressed in the 11 recommendations outlined in the Commonwealth government's paper "Moving on intelligent transport systems".

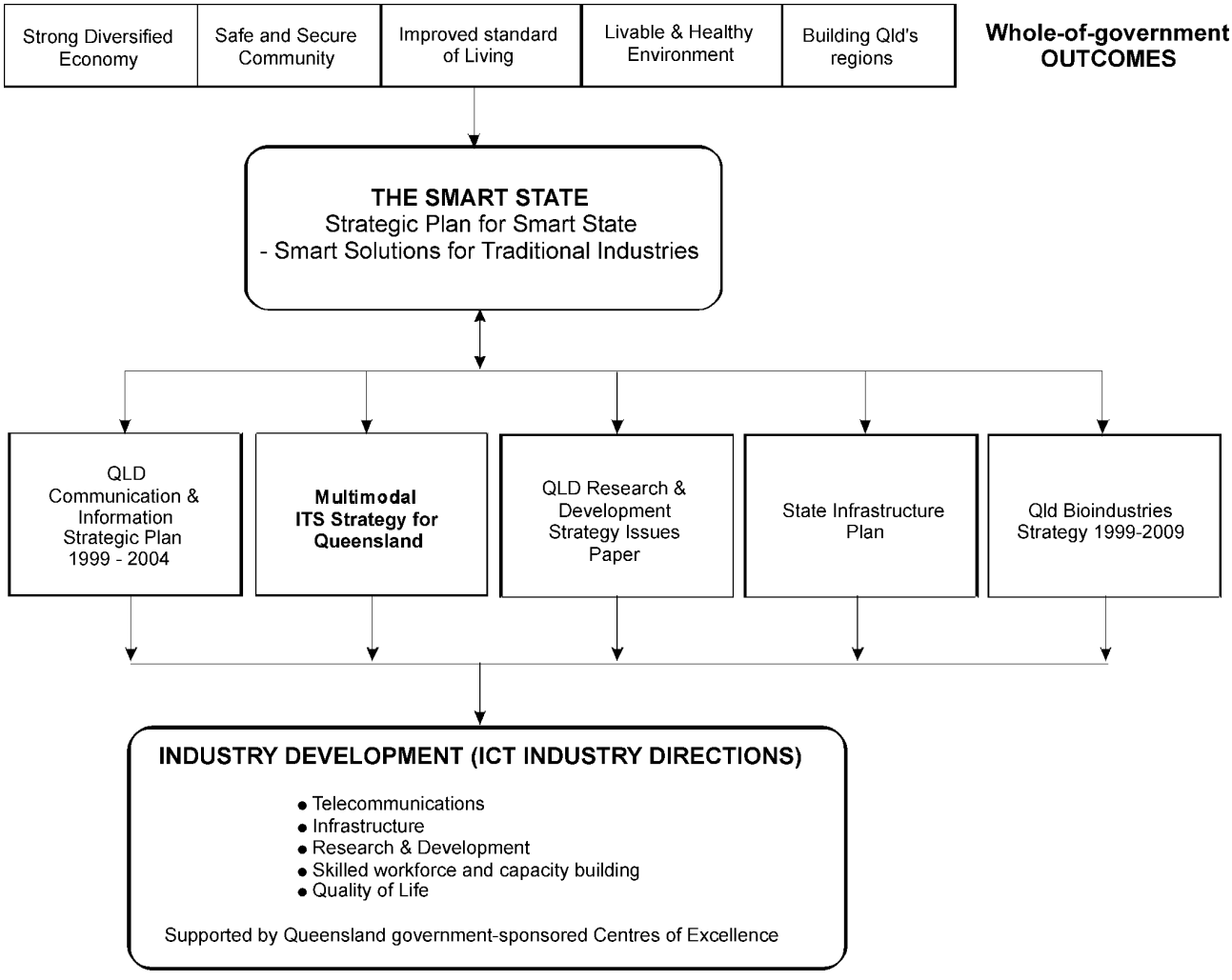

Figure 3: ITS Strategy contribution to The Smart State Agenda

Responsibilities

While the responsibility for implementing this Strategy lies with the Transport Portfolio, support and cooperation of major agencies involved in elements of the transport system are vital to its successful deployment. The responsibilities of the key agencies in relation to ITS are:

- Queensland Transport is currently responsible for ITS policy and development as it is applied in the areas of road safety, rail safety and maritime safety. Queensland Transport also liaises with Queensland Rail and air and seaport authorities to develop operational synergies in this field;
- Main Roads is responsible for the policy, architecture and deployment of road based ITS systems. Recognising the benefits of an optimal degree of integration, Main Roads will require that road based ITS applications are developed on the STREAMS ITS platform or from a standard set of ancillary systems; and
- Queensland Transport and Main Roads liaising with relevant stakeholders to develop synergies and integrated solutions.

Monitoring and Performance Indicators

Monitoring and evaluation is required to ensure the successful deployment of both the strategy and of ITS systems. This will be achieved through annual reporting against performance indicators for each objective in this Strategy.

Performance indicators have been developed for the high level strategic documents of Queensland Transport and Main Roads. This Strategy uses the performance indicators of these high level documents to facilitate corporate reporting on the success of the ITS Strategy's deployment. These high level documents are:

- MR Strategic Plan 2003-2008;
- QT Strategic Plan 2002-2006; and
- The Queensland Road Use Management Strategy (Main Roads and Queensland Transport).

Funding

The funding to implement the Strategy will be obtained from a number of sources but predominantly from existing Transport Portfolio budgets.

Variable message sign used to convey road safety messages and traffic management information.

Steering arrangements

The following diagram shows the new reporting structure for the development and implementation of ITS across the Transport Portfolio.

In order to effectively implement the ITS Implementation Program (supplementary to this document) the portfolio has to:

- coordinate ITS related activities across the portfolio
- harness appropriate internal and external resources for each ITS project.

This committee structure will facilitate these requirements.

Implementation of the Strategy will include the investigation of and feasibility studies for potentially important signature projects. Through the evolution and review of the Strategy, such projects may be identified as high priority with further funding requirements determined and established through a number of funding options.

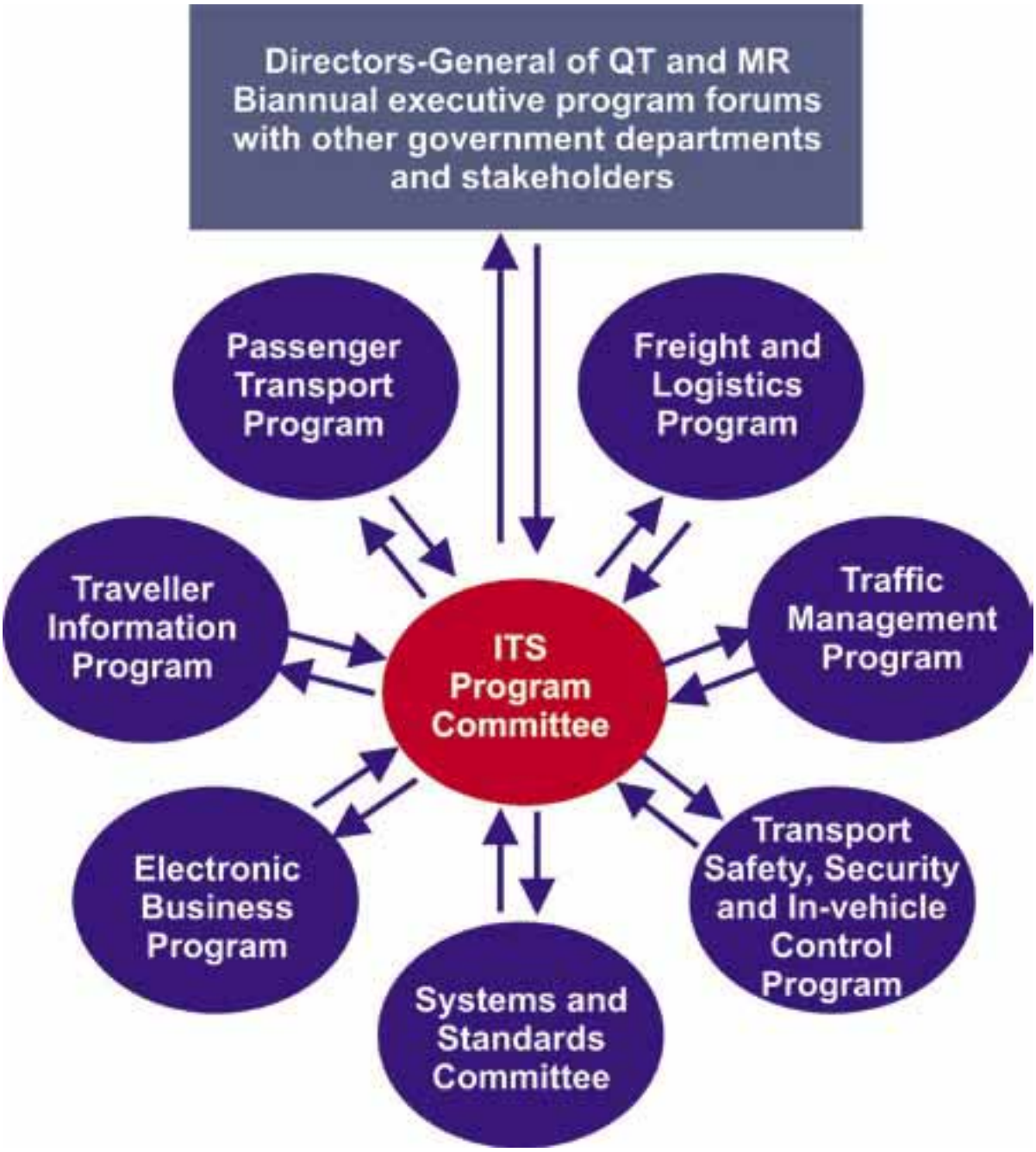

Figure 4: Program Committee Structure

Previous steering and coordination arrangements will be abolished. A new structure will be implemented aligning efforts more closely with the ITS implementation program. Biannual ITS executive forums will be held to showcase developments to the Directors-General, other government agencies and industry.

This structure provides the following benefits:

- The ITS Program Committee (ITSPC) will be the hub for ITS programme implementation and decision making including expenditure monitoring and resource coordination.
- The ITSPC will be made up of the executive staff charged with the delivery of ITS projects and is an ideal Portfolio based forum to share knowledge and skills at the Project Manager level.
- The ITSPC will be the most senior body in the Transport Portfolio for the implementation of ITS. This group will be driven by Transport Portfolio business (it is not necessary to have representatives from other departments or key stakeholders on this committee).
- Representatives from other state government departments and key stakeholder groups (for example, Brisbane City Council) are members of many ITS project-based committees (for example, integrated ticketing steering committee). At this level of input, strategies or priorities from other departments or stakeholders can be raised and understood appropriately throughout the development and implementation of the project. Reporting on these projects to other departments becomes the responsibility of their representative on the respective committee.

ITS Program Committee

The ITSPC will be the decision making body on ITS issues in the Transport Portfolio. The objectives of the ITSPC are:

- Coordinate and monitor the ITS projects and programs (including expenditure) of the projectspecific committees.
- Identify opportunities for synergies between projects and encourage interoperability between projects.
- Overview the development of ITS standards, policy and guidelines across the Transport Portfolio.

Membership of the ITSPC

The membership of the ITSPC will be limited to staff of the Transport Portfolio.

It is recommended that the chairperson of each of the project-based committee shown in the above diagram are members of the ITSPC along with relevant support staff as appropriate. The membership will be:

Queensland Transport

Executive Director (LTAS)

Executive Director (Passenger Transport)

General Manager (Translink)

General Manager (Maritime Safety Queensland)

Director (Strategic Policy)

Main Roads

Executive Director (Traffic and Road Use Management)

Director (Network Operations and Performance)

Committees reporting to the ITSPC

Committees implementing ITS related projects will report to the ITSPC through the executive directors of each relevant division.

A further committee recommended in this strategy is a System and Standards Committee to coordinate the development of the ITS Architecture and interoperability of systems. The membership and terms of reference of this committee will be determined by the ITSPC.

ITS Executive Forums

A series of ITS Executive Forums will be held annually. These will be designed to showcase ITS developments in Queensland to other state government departments and to the transport industry.

The objective of these forums would be to:

- Highlight key developments with flagship ITS projects.
- Share information on ITS projects and initiatives undertaken by Main Roads, Queensland Transport, Brisbane City Council, and other stakeholders.
- Disseminate learnings and share knowledge and findings on ITS technology.
- Present the development of ITS standards, policies and guidelines and the impact these instruments will have on the Portfolio's relationship with other departments, the transport industry and the travelling public.

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CASE STUDY:

STREAMS – (Synergised Transport Resources Ensuring Advanced Management Systems)

The first traffic management system installed at Surfers Paradise in 1969 managed 30 signalised intersections. This was followed with installations in Brisbane and other parts of the state. Currently, there are approximately 1200 signalised intersections managed by 18 systems throughout Queensland.

In the 1990s, in response to the increasing focus on Intelligent Transport Systems throughout the world and the clear need for integrated, interoperable systems, Main Roads began developing an ITS platform. The architecture specifies the hardware, systems software and applications software to be used for transport management in Queensland. The resultant product is STREAMS.

STREAMS includes a comprehensive range of sub-systems that can be configured as required for particular Intelligent Transport System implementations. STREAMS can be configured to manage a freeway network, manage traffic signals on surface streets, or both. Where both the freeway network and the surface street traffic signals are managed, diversion routes through the surface street network can be created automatically, if blockages occur on a freeway. Passenger transport related sub-systems such as passenger transport priority, passenger transport timetable management and real time traveller information can be added to any system if required.

STREAMS combines incident management, passenger information, driver information and surface street and freeway traffic management in a single, integrated system. This has major advantages, as traffic and transport managers can implement an integrated approach to network management.

Appendix A Objectives and Strategic Directions for ITS in Queensland

User Service – Traffic Management (All Modes)

Objective	Strategies
Road Transport	
TM1 Optimise traffic flow and safety within a total transport context	TM1.1 Apply best practice traffic management systems across Queensland TM1.2 Improve management of incidents through the sharing of information, sharing of infrastructure, and co-ordinated control between appropriate authorities TM1.3 Enhance the quality of service to emergency vehicles TM1.4 Enhance the quality of service to priority vehicles (heavy vehicles, public transport vehicles)
TM2 Maximise the utilisation of ITS technology in the collection of transportation data and information	TM2.1 Share data across systems and agencies
TM3 Ensure that ITS deployment programmes embrace the principles of Travel Demand Management	TM3.1 Investigate, support, and promote the use of ITS to improve the safety of pedestrians and cyclists TM3.2 Align ITS deployment with Travel Demand Management principles
Water Transport	
TM4 Develop International best practice and State-wide consistency in port procedures for Vessel Traffic Services (VTS) requirements	TM4.1 Apply international best practice for managing vessel traffic in Queensland waters.
TM5 Develop a complete seamless state-wide traffic management system.	TM5.1 Improve integration between port and coastal ship movements through the Ship Reporting System (SRS) and Vessel Traffic Services (VTS)
TM6 Strive for continuous improvement in systems and procedures to ensure VTM remains abreast of international guidelines.	TM6.1 Ensure that vessel traffic management (VTM) is continually updated to provide an efficient, cost effective, quality system that can cope with the latest trends in shipping and communication.

User Service – Traveller Information

Objective	Strategic directions
TI1 Improve guidance and information to drivers	TI1.1 Provide better information to transport network users TI1.2 Improve the quality and timeliness of information to travellers to assist in trip planning and to help them avoid congestion, crashes, incidents, flooding etc TI1.3 Develop Freeway Travel Time Information within the existing Transport Portfolio internet sites

User Service – Freight, Logistics and Heavy Vehicle Management

Objective	Strategic directions
FL1 Provide ITS infrastructure to support internationally competitive supply chains and just-in-time delivery	FL1.1 Ensure the ITS components of the transport system are appropriate to support the needs of the freight industry
FL2 Use ITS to optimise the efficiency, safety and security of freight movement while minimising impact on infrastructure	FL2.1 Improve the efficiency of vehicle access management with ITS FL2.2 Manage the freight task through efficient mass compliance management using ITS where appropriate for detection, compliance and enforcement FL2.3 Encourage and facilitate the use of ITS by logistics operators to improve the safety and efficiency of their business. Support this use by exploring the provision of real-time travel data to the industry FL2.4 Manage the freight task through efficient driver workload compliance management FL2.5 Minimise environmental impact of road freight
FL3 Improve inter-modal links by improving the capability for coordinated cargo tracking through the total logistics chain	FL3.1 Encourage the development of ITS that will provide data throughout the logistics chain and improve intermodal transfers for road, rail and sea

User Service – Public transport

Objective	Strategic directions
PT1 Improve the integration of public transport modes using ITS	PT1.1 Implement integrated ticketing to improve public transport integration
PT2 Enhance people's access to quality public transport information	PT2.1 Improve the accuracy and delivery of information to support increased use of environmentally sustainable transport. PT2.2 Improve techniques for public transport data capture and use
PT3 Enhance public safety on public transport	PT3.1 Improve procedures and products to increase security
PT4 Apply public transport innovation and technology	PT4.1 Investigate and utilise the latest developments available to public transport

User Service – Traveller Safety

Objective	Strategic directions
TS1 Reduce the crash risk and improve the behaviour of on-water and on-road operators and drivers	TS1.1 Lead national discussions on the assessment of ITS applications that can assist the driving task and improve safety TS1.2 Utilise in-vehicle technology to control the behaviour of drivers that commit traffic offences. TS1.3 Deploy best practice technology to ensure the safety of the road and maritime environments for all users

	TS1.4 Improve road safety through the development of a co-ordinated enforcement technology framework with Qld Police Service
TS2 Improve the transport systems capacity to support responses to natural and human-caused threats and disasters	TS2.2 Work towards coordination of ITS at both state and national levels to support contingency and counter disaster plans

User Service – Electronic business transactions

Objective	Strategic directions
EBT1 Better control of user access to the transport network	EBT1.1 Improve the means of delivering licensing products using the best available technology EBT1.2 Improve registration procedures and products to increase security and enhance enforcement and compliance
EBT2 Maximise the efficient use of transport-based smartcards	EBT2.1 Minimise the number of smartcards used in the road network through creating opportunities to share protocols EBT2.2 Improve tolling technology in Queensland in keeping with national practice EBT2.3 Broaden the application of smartcards beyond the transport sector

Enabling Issues – Planning

Objective	Strategic directions
PL1 Integrate ITS into transport planning process	PL1.1 Provide guidelines to define when ITS systems/ infrastructure are warranted
PL2 Improve the Transport Portfolio's capacity to prioritise projects which involve ITS	PL2.1 Enhance investment decision making tools, processes and methodologies to account for the contribution of ITS in transport projects
PL3 Adopt a consistent approach to project management of ITS projects	PL3.1 Develop an agreed project management process for the development and delivery of ITS projects from concept through to implementation

Enabling Issues – Policy

Objective	Strategic directions
Po1 Develop a transport portfolio ITS policy and procedures manual	Po1.1 Identify key ITS issues that need to be addressed in a transport portfolio ITS policy and procedures manual including ITS data and imaging sharing, ITS evaluation and prioritisation, legal liability, privacy, intellectual property, ITS standards and specifications
Po2 Establish a policy environment that responds to the challenges of research and innovation and attracts research and development to Queensland	Po2.1 Identification of trends in ITS technology and its potential impact on existing legislation and policy

Enabling Issues – Integrating Systems (systems, communications, field equipment)

Objective	Strategic directions
IS1 Understand functionality and interactions of existing ITS applications within the Transport Portfolio	IS1.1 Map existing ITS systems
IS2 Create an overall ITS system "framework" to facilitate rational development of future ITS systems	IS2.1 Develop a "framework" for the Transport Portfolio based on the learnings from the mapping of ITS systems in Queensland IS2.2 Produce and maximise the utilisation of ITS communications and field equipment infrastructure
IS3 Contribute to the development of a National ITS Architecture	IS3.1 Sharing the learnings from the mapping of existing ITS applications in Queensland
IS4 Develop a central transport management centre to integrate traffic management systems to ensure consistency of services across the full transport network	IS4.1 Development of a strategy for a single Transport Portfolio Transport Management Centre to include all agencies (Main Roads, Qld Transport, BCC, Police, Emergency Services)

Enabling Issues – Relationships

Objective	Strategic directions
R1 Lead the creation of a culture that continues to reduce institutional barriers among ITS stakeholders	R1.1 Create an environment that encourages participants to share ideas, learnings and information and to debate the future direction of ITS R1.2 Clarifying roles/responsibilities of Queensland Transport and Main Roads major ITS clusters R1.3 Foster a culture which develops innovative ITS solutions

Enabling Issues – Capability

Objective	Strategic directions
C1 Develop a vibrant, highly-skilled ITS workforce	C1.1 Ensure transport professionals have the appropriate skills to plan, design, deploy, operate, maintain and evaluate ITS systems
C2 Undertake research and development in priority ITS	C2.1 Set priorities for ITS research and development in Queensland

Enabling Issues – Awareness

Objective	Strategic directions
A1 Communicate the significant contribution ITS can make in achieving safety, efficiency, livability and environmental outcomes	A1.1 Highlight the ability of ITS to contribute to desired transport outcomes of increased safety, effective and efficient transport network, fair and equitable access to the transport network, and environmental management A1.2 Develop a multi-level awareness-raising program to highlight and promote the portfolio's use of ITS to assist in solving transport problems.