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ITS in Australia: An overview

2.1 Intelligent transport systems have a long history in Australia. The first ITS systems were introduced in Australia in the early 1970s.[1] over the ensuing three decades, the Australian public, the transport industry and the economy has come to rely more heavily on the efficient operation of ITS. To place ITS in context, it is necessary to review briefly what intelligent transport systems are, what ITS technologies have been implemented in Australia and the benefits that ITS are likely to provide to Australia.

What are intelligent transport systems (ITS)?

2.2 ITS-Australia defined intelligent transport systems (ITS) as:

> The application of modern computer and communication technologies to transport systems, to increase efficiency, reduce pollution and other environmental effects of transport and to increase the safety of the travelling public.[2]

2.3 Intelligent transport systems (ITS) integrate currently available and emerging information, computer, communications and vehicle-sensing technologies into transport infrastructure and vehicles in order to monitor and improve the safety, efficiency, management and operations of vehicles and transport systems.

2.4 The 'currency' of an intelligent transport system is information. The information generated by an ITS is used by traffic system managers and users to make timely and informed decisions as to vehicle usage and

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1 'Intelligent Transport Systems: Potential benefits and immediate issues', Facing the Main Roads Lecture Series, Main Roads Western Australia, www.mrwa.wa.gov.au/projects/strategies/future/its_paper04.pdf; accessed: 26 September, 2002.

2 ITS-Australia, submission no. 3.

deployment, to reduce congestion, pollution and accident risk. The predicted outcome of ITS are improved efficiency, safety, and environmental performance of vehicles and transport systems.

2.5 Specifically, intelligent transport systems apply advanced technology to:

- integrate all aspects of different transport modes (rail, road, air and sea) into one integrated transport system, to attain improved traffic efficiency and reduced congestion;
- control traffic;
- inform drivers and operators of vehicles about traffic and road conditions and availability of services;
- efficiently operate public transport;
- automate payment of road use charges;
- handle emergencies and incidents;
- operate commercial fleets and freight interchanges; and
- monitor vehicle control systems to allow vehicles to detect moving obstacles and communicate with road-side infrastructure to improve and automate road-user and driving safety.

2.6 The specific technology involved in ITS can be applied broadly across the transport sector. Specific applications include:

- Public Transport Systems so that they use advanced technologies to improve safety, efficiency and effectiveness. Benefits for the public transport user include reduced delays, ticketing convenience and security, and accurate route and schedule information.
- Traffic Management Systems are concerned with the overall management of traffic. These systems deploy ITS technology in projects that endeavour to reduce traffic and freeway congestion and enhance safety. The technology is applied to traffic signalling systems, traffic safety and route and congestion management.
- Traveller Information Systems use ITS technology to better inform the traveller about road, environment and traffic information. These systems incorporate the use of advanced information and navigation technology to enhance driver safety and play a role in minimising freeway and traffic congestion.
- Commercial Vehicle Systems are involved with the management and operation of commercial vehicles. ITS technology is deployed to better manage and service the freight industry and minimise on-route

interference and delays while still maintaining the highest level of safety and cost efficiency. These systems play an important role in the management of truck fleets to improve efficiency.

- Vehicle Control Systems provide improved road safety by allowing the vehicle to assist the driver. Vehicles have been developed which monitor the ever-changing driving conditions and take necessary measures to avoid accidents.[3]
- Electronic Toll Collection utilises ITS technology to provide a cost effective way of collecting vehicle tolls. These systems deploy ITS technology to collect tolls efficiently and minimise delays thus reducing traffic congestion.[4]

ITS in Australia

2.7 The committee was told repeatedly that while Australia leads the world in certain aspects of ITS research[5], technology and the implementation of certain aspects of ITS, it trails behind in other areas.[6]

2.8 A range of ITS initiatives have been implemented by various governments in Australia. Some examples currently operating in Australia, include:

- Adaptive traffic control systems, to provide priority for road-based public transport vehicles;
- Freeway management and information systems, to reduce delays due to traffic incidents;
- Electronic fare collection systems, to improve the convenience of public transport travel and reduce system costs;
- Electronic Tolling;
- In vehicle navigation and information systems, to assist drivers and reduce unnecessary travel;

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3 Other innovations include driverless vehicles travelling at highway speeds. See http://www.qits.net.au/about_its.asp; accessed 11 November, 2002.

4 *About ITS*, http://www.qits.net.au/about_its.asp; accessed: 25 September, 2002.

5 Inspection and briefing, RTA Traffic Management Centre, Sydney; CSIRO and ITS-Australia briefings, Sydney. 'Intelligent Transport Systems: Potential benefits and immediate issues', Facing the Main Roads Lecture Series, Main Roads Western Australia, www.mrwa.wa.gov.au/projects/strategies/future/its_paper04.pdf; accessed: 26 September, 2002.

6 For example, the adoption of ITS by the freight logistics industry, the lack of a single, national traveller information number, and continuing problems with the interoperability of the different toll collections systems in Australia. These matters are canvassed later in this report.

- Vehicle location and scheduling systems, to reduce theft, improve roadside service, and improve efficiency of freight movement; and
- Advanced traveller information systems, to improve users' understanding and efficiency of use of public transport systems.

2.9 In addition, there are several ITS trials currently being conducted on Vehicle Collision Avoidance Systems, Remote Vehicle Guidance Systems and Automated Highway Systems. Other major ITS projects include a national tolling working group, a national trucking location and access study, an in-car driver awareness program, bus information systems and an urban freight study.

ITS Research and Development

2.10 A number of Australian universities and research organisations are involved in ITS research. These include: The University of Sydney, Monash University, Queensland University of Technology, The University of New South Wales, The University of South Australia, The Transport Systems Centre, and The University of Queensland.

2.11 The Intelligent Transport Systems (ITS) Research Facility has been established through an Australian Research Council Infrastructure Grant and contributions from a consortium of Australian universities, road and transport authorities and the private sector. The research facility provides basic research infrastructure needed to develop, test and evaluate ITS technologies and traffic management control strategies. Very few similar facilities exist around the world.

2.12 The facility will enable researchers to develop and evaluate advanced traffic management and advanced vehicle technologies to improve the safety and efficiency of the transport system. The facility comprises:

- An Intelligent Transport Systems Research Laboratory at the University of Queensland; and
- An Intelligent Vehicle Systems Laboratory at Griffith University.

2.13 The CSIRO, undertakes a range of research projects in ITS. Scientific skills areas involved in ITS research include simulation, process modelling, spatial & temporal optimisation, Artificial Intelligence planning, data engineering, and software engineering. Inter-divisional collaboration involves other CSIRO skill groups such as telecommunications. Many CSIRO activities are conducted in collaboration with the industry.

2.14 Specific ITS research conducted by the CSIRO includes a 'Transport Futures' project. This project aims to design new transportation technologies and practices needed for the 21st century.[7]

2.15 Developments already implemented include Safe-T-Cam™, a digital imaging system that automatically detects and classifies moving vehicles, identifying large vehicles and reading their number plates. Safe-T-Cam™ was developed by Telstra, the Roads and Traffic Authority of NSW (RTA), and CSIRO. Safe-T-Cam™ encourages drivers to comply with operating and road worthiness rules. It protects revenue by enforcing registration rules, improves the efficiency of enforcement activities, and facilitates traffic management by generating accurate information.[8]

ITS Business

2.16 Australian companies are involved in the development and commercialisation of ITS technology. For example, Saab-ITS is a Brisbane based joint venture company recently established by Saab-Systems and Brisbane City Enterprises (BCE), the commercial arm of the Brisbane City Council (BCC). Saab-ITS aims to develop and sell state-of-the-art traffic control systems worldwide.

2.17 Saab-ITS' core business is advanced operational software, intensive systems development, production and support for the intelligent transport market. Saab-ITS handles the international marketing and sales of BCE's two intelligent transport products: RAPID, the real-time advanced priority and information delivery for buses, and BLISS, Brisbane's linked intersection signal system.[9]

2.18 The program was developed and refined in Brisbane over the past 15 years and was recently delivered to the Johor Bahru traffic authority in Malaysia. The company has already been selected for an intelligent transport system contract in Auckland worth $5.5 million and is undertaking the implementation of a $3.5 million lane control system ('tidal flow') on Coronation Drive Brisbane for BCC.[10]

2.19 Another company developing and exporting ITS technology is the Mi Services Group of South Perth. Mi Services was involved in the custom development of complex software for projects such as Melbourne's

7 http://www.dbce.csiro.au/research/project.cfm?proj_id=31; accessed: 26 September, 2002.

8 http://www.csiro.au/promos/billiondind/contents/smart.htm; accessed 26 September, 2002.

9 RAPID facilitates bus priority at traffic signals and provides passengers with the latest information on the expected arrival time of their bus. BLISS is a computer program that monitors traffic volume at key intersections and changes the timing of traffic signals to ensure the most speedy and efficient traffic flow.

10 http://www.saab-its.com.au/about%20us.html; accessed 25 September, 2002.

CityLink Central Control System and the Perth Traffic Control Centre's traffic management and control system that integrates freeway ITS facilities (such as closed circuit television, incident detection and variable message signs) with urban traffic signal control.[11]

2.20 ITS have been developed and implemented in a number of Australian jurisdictions.

Queensland

2.21 A number of ITS projects have been implemented in Queensland, and others are under development. ITS projects implemented include:

- The Pacific Motorway, a world-class transport link between Brisbane and the Gold Coast, which encompasses a range of ITS applications.
- The Ship Reporting System, a world-first mandatory ship reporting system which monitors ship movement along Queensland's Great Barrier Reef.
- The South East Busway, a dedicated two-lane roadway stretching through Brisbane's south-east suburbs for the exclusive use of buses, utilising a range of ITS technologies.
- Coronation Drive as previously described;[12]
- STREAMS, the Queensland Department of Main Roads' integrated intelligent transport system. It is installed throughout Queensland and manages both freeways and more than 1000 signalised intersections. STREAMS provides ITS services including freeway and surface street traffic management, incident management, passenger information and driver information, traffic signal management - adaptive coordination plan selection, adaptive movement control, public transport priority and VIP and emergency vehicle priority.[13]

2.22 A number of ITS are under development in Queensland. These include:

- Intelligent Access System which will enable the Queensland Department of Main Roads and Queensland Transport to expand work on remote monitoring of heavy vehicles via satellite tracking to encompass an electronic compliance monitoring regime. This system will form a platform for a national approach.

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11 http://www.indtech.wa.gov.au/trade/awards/2001/mi.htm; accessed 26 September, 2002.

12 See 2.18, above.

13 http://www.mainroads.qld.gov.au/MRWEB/Prod/Content.nsf/; accessed 28 September, 2002.

- Maroochydore Parking Guidance System which will assist motorists to find parking around the Sunshine Plaza at Maroochydore, located on Queensland's sunshine coast.
- Mt Molloy Load Limit Information Sign which will provide timely and accurate information to motorists during times of wet weather.
- Palmerston Highway Heavy Vehicle Safety Advisory System which is designed to educate drivers about their behaviour and to influence them to drive more safely.

2.23 The CSIRO, advised the committee that ITS technologies under development in Queensland included: road flood warning, variable message and mobile telephone messages, combining Bureau of Meteorology data with that from flood plain and Queensland Main Roads road terrain data, to predict road availability and water hazards.[14]

New South Wales

2.24 A number of ITS systems have been installed in New South Wales, the most significant of which is Sydney Coordinated Adaptive Traffic System (SCATS). This system was commissioned in 1972. SCATS coordinates and controls over 3000 intersections by continually adjusting the phasing of traffic lights so that they respond to traffic flow and traffic incidents. The RTA advised the committee that SCATS is recognised as the world's leading traffic signal control system, being used in over 80 cities throughout the world.

2.25 The RTA is developing an enhanced software package, SCATS 2, to take advantage of modern software, hardware and communications technologies. This software will provide all of the functions of the existing system as well as new facilities to provide for future advanced traffic management needs, including provision for dynamic bus priority. Other ITS technologies in use in NSW include:

- The Safe-T-Cam™ system enables the identification of speeding or un-rested truck drivers by photographing and then 'reading' the numberplate.
- F6 Fog Detection System, which uses sophisticated detection systems and Variable Message.
- Signs (VMS) are used to advise motorists of poor visibility, excessive speed, and when a motorist is too close to the vehicle ahead.

14 Briefing, Sydney, 15 August, 2002.

- Electronic Toll Collection on, for example, the M2, M5, and the Sydney Harbour Bridge. Toll charges are levied electronically as vehicles pass through toll plazas. Manual toll-booths also exist.

2.26 Since 1998/99 incident management initiatives have included the expansion of closed circuit television coverage, automatic incident detection facilities, Variable Message Signs (VMS) and Variable Speed Limits (VSL). These initiatives commenced with the completion of the pilot M4 Motorway scheme.

2.27 The major traffic management resource within the RTA is the Transport Management Centre (TMC) situated in Sydney's inner South. The TMC enables the RTA to take an innovative and integrated approach towards the management of the NSW road network. The TMC also provides a command capability for managing the transport task of special events such as the Easter Show and the Olympic Games.

Victoria

2.28 A variety of ITS applications have been installed on the Victorian road system, by VicRoads[15]. These have included:

- Drive Time (a real time traffic information sign);
- Variable message signs;
- Incident detection systems;
- Ramp metering;[16]
- Freeway condition signs;
- Ice detection systems;
- Closed circuit television cameras; and
- Roadside speed check systems.

2.29 In 2002, VicRoads installed a computer controlled dynamic speed limit system on the Western Ring Road in Melbourne. This system will monitor traffic congestion and calculate the best traffic speed that will optimise

15 VicRoads is the registered business name of the Roads Corporation, a Victorian statutory authority. VicRoads is responsible for maintaining and improving the condition and performance of Victoria's 22,240 km of arterial roads and 4924 bridges and major culverts. VicRoads also develops road safety programs, registers vehicles and licenses drivers. http://www.vicroads.vic.gov.au/vrne/vrninte.nsf/; accessed: 26 September, 2002.

16 Ramp metering is the practice of regulating the rate at which cars enter an urban freeway by means of traffic signals at entrance ramps. It is an increasingly common traffic management technique in metropolitan areas with extensive freeway networks. http://www.its.umn.edu/sensor/2001/spring/virtualmicroscope.html; accessed 24 October, 2002.

traffic flow. The speed limits will be transmitted to drivers via a series of 80 roadside electronic signs. VicRoads also advised the committee that the Geelong Road Project would also incorporate a number of ITS applications. This project was due for completion by the end of 2002.[17]

Western Australia

2.30 Successive Western Australian administrations have implemented ITS policies and as a result, a number of ITS technologies have been installed in Perth.[18] These include:

- Computerised Traffic Control Signals which are based on the SCATS system in Sydney. This system monitors traffic flow, adjusts the timing and coordination of traffic signals and reports signal faults 24 hours per day. The first traffic signals were connected to SCATS in 1983 (on the Albany Highway), and the coverage has continued to grow to the extent that all traffic signal installations in the State (approximately 730 sites) are now connected.
- CCTV - Monitoring systems. Closed circuit television cameras (CCTV) have been installed throughout the metropolitan area as part of the development of Perth's Intelligent Transport Systems. The cameras – so far 41 have been installed – provide valuable real time information on road and traffic conditions to the trained operators at the Traffic Operations Centre, who monitor them 24 hours per day. Video images from the various camera sites are also broadcast on this web site as part of Traffic and Road Information.
- Traffic Operations Centre. A modern, purpose-built facility that manages the Perth metropolitan road network and the control systems associated with the Graham Farmer Freeway tunnel.
- Variable Message Signs (VMS) are used to deliver on road information to motorists in real time. The types of VMS range from simple one or two line message signs to fully variable signs that can include graphical displays pertaining to traffic conditions, current freeway travel speeds and road safety messages.
- Traffic and Road Information is an internet based system that allows users to obtain road information and report faults. Information that can be obtained via the web site include: images from CCTV cameras, congestion status, freeway speeds, traffic and roads conditions reports, and roadworks.

17 VicRoads, submission no. 2.

18 http://www.mrwa.wa.gov.au/traffic/its/; accessed 28 September, 2002.

- HERO - Highway Emergency Response Operations. The aim of HERO is to improve the safety and efficiency of Perth's freeways by minimising disruption to traffic caused by incidents.
- Weigh In Motion System, Fremantle. This system uses an electronic scanner and automatic weighing equipment to weigh trucks, monitor speeds and identify the vehicle. Vehicles carrying containers into and out of the port of Fremantle register the legal capacity of the load and have an electronic tag fitted to the windscreen. The system helps prevent damage to roads and vehicles.[19]
- Trialing New Technologies. Main Roads Western Australia has trialed a number of new ITS technologies. These include: Video Traffic Detection where video cameras are used to detect the movement of vehicles on roads and freeways. Video detectors can replace more conventional systems that usually use inductive loops to register vehicle movement. Another technology trialed is intelligent pedestrian crossing signals that automatically cater for all users. Pedestrian User Friendly Intelligent (or PUFFIN crossings) automatically detect the presence of pedestrians crossing the road and will allocate extra time to the walk phase if needed.

Other ITS innovations

2.31 Australiawide Loading Pty Limited (since 2001 known as FR8solutions communications) was established in 1999 to provide a telephone & teletext based freight matching system for truck operators. The system provides one contact point rather than multiple agents scattered throughout the country, and so delivers economies of scale. Australiawide Loading is a free service for the truck operators, who indicate their availability up to a month in advance. More than 50,000 operators have access to the system.

2.32 Australiawide Loading uses the technology of the world wide web and communication with the vehicles by mobile phone, and employs a unique matching system that provides access to the entire client base on a 24 hour, 7 day a week basis.[20] FR8solutions communications was established as an initiative of the National Office of the Information Economy (NOIE).

2.33 The committee was briefed on the 'driverless trucks' at Tarong Coal Mine. The coal mine has six driverless trucks that transport coal to dumping

19 Andrew Garrett, *Intelligent Transport Systems: Potential Benefits and Immediate Issues*, Facing the Main Roads Lecture Series, Main Roads Western Australia, www.mrwa.wa.gov.au / projects / strategies / future / its_paper04.pdf; accessed: 26 September, 2002.

20 http: / / www.alis.com.au / About.aspx; accessed 25 September, 2002.

stations and also travel to refuelling stations as needed. The roads they travel are not fenced off, but are open to the passage of other vehicles, including cars and trucks, as well as pedestrians. The trucks use global positioning systems, anti collision sensing. All systems on the driverless trucks are triply redundant. The benefits of these 'intelligent' vehicles include reduced engine wear, and longer tyre life. Tyres for the trucks are $US10,000 each. Driver controlled trucks use two sets per truck per year; the tyres on the driverless trucks last three years.[21]

2.34 'Milk link' is a demonstration project, funded under the e-transport national strategy, to replace paper-based farm and quality management systems involved in milk production, with records maintained on hand-held computers. The records involve not only production data but also animal data, such as vaccination and other health records. These records are searchable and easily transferable to milk processors and other interested parties.[22] Dairy foods processors can then use information about the quantity of milk produced on any one day to dispatch the right number of milk tankers of the right size at the right time. This better matches transport infrastructure to the task at hand leading to more efficient use of trucks, and fuel.

Not all good news

2.35 Transport industries have been slow to adopt ITS, according to DoTaRS. The department reported that, even though the appropriate uptake of E-commerce by the Freight Transport Logistics (FTL) industry is a cornerstone on which future advances in seamless logistics management will be made, according to figures issued by NOIE only 50% of the 30,690 road freight operators have an internet connection. It appears that freight operators perceive a lack of business benefit from current E-commerce systems when weighed up against the costs of investing and updating the technologies.[23]

2.36 DoTaRS also reports that another factor reducing the adoption of ITS revolves around the confusion whether E-commerce systems will offer the industry a durable solution that will meet their future needs. Overall, DoTaRS paints a stark picture:

> The fragmented nature of the FTL industry frequently gives rise to delays and misunderstandings between participants which

21 Mr Colin Jensen, Briefing, Brisbane 13 September, 2002.

22 ITS - Australia, submission no. 3.

23 'Linking Ahead', Industry Steering Committee Discussion Paper, Australian Freight Transport Logistics Industry Action Agenda; http://www.dotrs.gov.au/transinfra/aftliaa/linking_ahead.htm; accessed 11 November, 2002.

> escalate along the supply chain. A key example of this is the lack of coordination of vehicle movements in and out of the port interface, leading to congestion and delays that affect shippers, importers and the end customers. Stevedores have introduced vehicle booking systems (VBS) to address this problem and improve the scheduling of vehicle movements. These have had a positive impact on this issue, however, they rely heavily on the cooperation of road transport operators who often lack the facilities to comply with the system and/or meet the associated expenses.[24]

Benefits of Intelligent Transport Systems

2.37 The proponents of ITS claim that ITS will lead to more efficient use of the transport system and fewer accidents. Reducing the costs associated with the transport system, and the number and severity of accidents will result in lower transport costs for industry and lower costs of operating a transport system for the community. The specific benefits of a more efficient transport system include:

- Reduced traffic congestion and reduced costs associated with congestion. For example, reduced travel time, reduced fuel use, lower environmental costs and reduced pressure to build more roads;
- Improved competitiveness and performance of the freight/logistics systems and increased efficiency of vehicles using the road system (less fuel consumption per kilometre, increased payload and fewer vehicles operating unloaded or partly loaded);
- Increased patronage of the rail system, which leads to lower transport costs and less pressure to build expensive transport infrastructure; and
- Reduced costs associated with vehicle use and ownership, such as theft[25] and journey planning.[26]

Is ITS needed?

2.38 There is considerable evidence collected from within Australia, and abroad, that ITS can produce considerable reductions in accident rates and

24 *Transport Infrastructure Policy*, http://www.dotrs.gov.au/transinfra/aftliaa/linking_ahead.htm' accessed: 25 September, 2002.

25 ITS - Australia, submission no. 3.

26 ITS - Australia, submission no. 3; Mr Colin Jensen, Briefing, Brisbane, 13 September, 2002; *E-transport: The national strategy for intelligent transport systems.*

improvements in transport efficiencies. There is also strong evidence that reductions in accidents and improvements in efficiency will produce significant financial savings to the community, largely through the more focused use of existing transport infrastructure and through reducing the need to build more, larger roads.

2.39 For example, the committee was advised by ITS - Australia that ITS is estimated to provide a benefit/cost return of 10:1, while Mr Colin Jensen advised the committee the cost to benefit ratio was in the range 4.8:1 to 19.0:1, with the lower estimations being 'considered conservative'.[27] In *e-transport: The national strategy for intelligent transport systems*, benefits were estimated to total, in net 1999 value terms to 2012, at least A$14.5 billion. This was reported to be consistent with reducing the total costs of road accidents, congestion and vehicle emissions for the year 2012 by at least 12%, compared to the situation of not using ITS.[28] Specific savings were estimated as:

- $3.5 billion in efficiency savings;
- $3.8 billion in savings from safety; and
- $7.5 billion in savings from reduced congestion and lost time.

2.40 By 2012, it is estimated that additional community and economic benefits of at least $3.8 billion per annum, excluding export income, will be produced if ITS are implemented.[29]

2.41 These savings can be put in context when various other measures of the transport system are taken into account. For example, in the period January to August, 2002, 1,143 people died on Australian roads and in the year September 2001 to August, 2002, 1,749 people died as a result of road accidents. While the human misery from road accidents is incalculable, the monetary cost of crashes is in the order of $15 billion per annum (1996 data).[30] A reduction of just 10% in the number killed on the road, reduces the human and financial costs enormously.

2.42 Annually, some 139,000 vehicles are stolen, resulting in an average cost of $8,100 per insurance claim, with a cost to the community estimated at around $1 billion before the costs of lost production and inconvenience are included.[31]

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27 ITS-Australia, submission no. 3; Mr Colin Jensen, Briefing, Brisbane, 13 September, 2002.

28 *E-transport: The national strategy for intelligent transport systems*, p. 1.

29 Booz Allen & Hamilton, *Intelligent Transport Solutions for Australia*, summary report, Sydney: 1998.

30 Australian Transport Safety Board, http://www.atsb.gov.au/road/index.cfm; accessed 25 September, 2002.

31 ITS - Australia, submission no. 3.

2.43 There is clear evidence of considerable inefficiencies in the Australian transport system. In 1998 it was reported by the CSIRO that traffic congestion levels were increasing by 8% per annum. The CSIRO also reported that traffic congestion has negative impacts on transport efficiency, road safety, human health and the environment. The CSIRO states that 'In Australia, congestion, malfunctions and transport delays are estimated to cost over $5 billion per annum in travel time and vehicle operating costs'.[32]

2.44 This may well be an underestimate. In a keynote speech to the Tourism and Transport Industry Leaders' Summit, 26 September, 2002[33], the Deputy Prime Minister and Minister for Transport, the Hon John Anderson MP, reported that at present congestion cost the Australian community around $13 billion per annum and that this would rise to over $30 billion per annum over the next fifteen years or so, if we continue to manage transport as we do at present.

2.45 Intelligent transport systems are expected to reduce greenhouse emissions and thereby produce considerable positive environmental outcomes. ITS does this by improving traffic flows and vehicle management, leading to reduced fuel consumption. It is estimated that ITS will produce fuel savings of between 2% and 13% and reduce emissions by between 5% and 15%.[34] Putting this in context, in 1998 Australia's transport sector contributed about 12% to the total of Australia's greenhouse gas emissions, with road transport accounting for 81% of these emissions. It is estimated that a reduction of road transport related emissions by 20% would reduce Australia's total greenhouse gas emissions by almost 2%.[35] Mr Colin Jensen supported these figures and advised the committee that projected benefits from ITS include:

- E-tags (aka: E-Zpass) reduced delays 85%; saved approximately 4.5 million litres of fuel each year, 130,000 kg of volatile organic compounds and 20,800 kg of nitrogen oxides;
- Traffic signal improvements reduced fuel consumption by 2% - 13%.[36]

32 CSIRO, *ITS-Connect – A Nationwide Approach to Intelligent Freight Transport*, http://www.dbce.csiro.au/innovation/2000-10/its_connect.htm; Booz Allen & Hamilton, *Intelligent Transport Solutions for Australia*, summary report, Sydney: 1998.

33 http://www.ministers.dotars.gov.au/ja/speeches/2002/AS26_2002.htm; accessed 11 November, 2002.

34 Booz Allen & Hamilton, Intelligent Transport Solutions for Australia, summary report, Sydney: 1998.

35 'Intelligent Transport Systems: Potential benefits and immediate issues', Facing the Main Roads Lecture Series, Main Roads Western Australia, www.mrwa.wa.gov.au/projects/strategies/future/its_paper04.pdf; accessed: 26 September, 2002.

36 Briefing, Brisbane, 13 September, 2002.

2.46 Relatively cost effective ITS technology can produce considerable positive safety outcomes. For example, collision warning systems are reported to reduce road accidents by between 33% and 40%.[37] This would appear to be supported by information published by the European Union, which is implementing a large ITS strategy. The EU has reported that the use of the variable message signs on motorways has reduced rear-end collisions by 30% (in fog by 85%); advanced driver assistance and anti collision systems have reduced accidents by around 50%.[38]

2.47 Although comparisons with overseas jurisdictions are not simple or direct, a range of Japanese, European and Unites States estimates suggest that ITS applications will reduce road accidents by 20% - 40%, and reduce urban travel times by around the same amount.

2.48 Freeway management systems in the United States are reported to have reduced accidents by between 24% to 50%, while handling 8% - 22% more traffic, at speeds 13% - 48% faster than the pre-existing, pre-ITS conditions. Japanese estimates indicate that investment in appropriate systems could reduce the road toll by 20% and expressway congestion by 70%.[39]

2.49 Safety improvements were also highlighted in briefings the committee received. Mr Colin Jensen indicated that ITS was found to improve safety:

- Red-light violations down by 20%-75% at different control points;
- Ramp-metering reduced accidents by 15% - 50% and reduced freeway travel times by 22% saving 25,121 hours;
- Real-time video monitoring on buses reduced assaults by 33%;
- Global positioning systems reduced emergency response times by 20%.[40]

2.50 Mr Jensen also indicated that adaptive signals reduce delays by between 14% - 44%, and that if 15% of vehicles staggered departure times by 20 minutes, there was a reduction of 80% in delays from congestion. Mr Jensen also reported an example from Florida where, when the toll was changed to higher rates during peak periods (the so called 'value-time pricing' approach), 20% of vehicle operators adjusted departure times.

2.51 The savings to business and ultimately the consumer of implementing ITS are predicted to be considerable. For example, a 1999 study conducted by

37 ITS-Connect – A Nationwide Approach to Intelligent Freight Transport, http://www.dbce.csiro.au/innovation/2000-10/its_connect.htm

38 *e-Europe: An Information Society For All*, Communication on a Commission Initiative for the Special European Council of Lisbon, 23 and 24 March 2000.

39 *e-transport: The national strategy for intelligent transport systems*, p. 1.

40 Briefing, Brisbane, 13 September, 2002.

the National Office of the Information Economy (NOIE) estimated that Woolworths could save up to $1 billion per annum through the appropriate implementation of E-commerce to automate its transactions with transport providers.[41]

2.52 Against this background are predictions surrounding increased transport infrastructure use in the years ahead. By 2012, the amount of freight transported is predicted to double[42] and by 2020, traffic is predicted to increase in volume by 50%.[43]

2.53 The importance of improved efficiencies in the transport system for the national economy is brought out clearly when the place of the transport system in national prosperity is understood. About 1960 million tonnes of freight are transported around Australia each year and about 496 million tonnes of freight are exported from Australia each year. Australians drive an estimated 181 billion kilometres each year.[44]

2.54 NOIE reports that the *road* transport industry *alone* accounts for 3.5% of Australia's GDP or some $14.692 billion and employs 2.6% of the Australian workforce or 223 500 people.[45]

2.55 The road transport industry plays an important role in the final value/cost of many other goods and services. For example, the road transport industry adds $6.70 per $100 of final output for milk and meat. NOIE notes that 'improving the efficiency of this [the road transport] sector through greater effective use of e-commerce has the potential to flow through to efficiencies in other sectors [of the economy]'.[46]

2.56 The logistics industry is a major pillar of economic prosperity, not only in this country, but abroad.[47] DoTaRS reports that the:

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41 *Trucks Online: National road transport scoping study*, Commonwealth of Australia, 1999, p. v.

42 *Background Briefing*, 'Rail, Road and Money', 28 April, 2002, ABC Radio National.

43 The Warren Centre, submission no. 1, attachment, "Moving People – Executive summary", a report in the Sustainable Transport in Sustainable Cities Project.

44 http://www.bte.gov.au/docs/trnstats02/trnstats.htm; accessed 30 September, 2002.

45 *Trucks Online: National road transport scoping study*, Commonwealth of Australia, 1999, pp. 2-3.

46 http://www.noie.gov.au/projects/ecommerce/Sector/Transport/; accessed 26 September, 2002.

47 The Logistics Association of Australia defines logistics as: '… the cost effective process of planning, implementing and controlling the efficient movement and storage of raw materials, finished goods, services and related information from point of origin, through manufacturing, warehousing and distribution to the end user for the purposes of conforming to customer requirements.' On this account, freight transport logistics is the science or management of the movement of freight and is essentially the process that ensures that the right resources are positioned in the right place, at the right time, in the right quantity and quality, and at the right price. Excerpted from: *Transport Infrastructure Policy*, http://www.dotrs.gov.au/transinfra/aftliaa/linking_ahead.htm' accessed: 25 September, 2002.

> … OECD estimates that logistics activities (including customer interfaces, supplier interfaces, transportation, warehousing and materials handling, materials planning, information systems and management) comprise 11-16% of world gross domestic product (GDP). Applying a similar proportion to the Australian economy it would mean that logistics activities are worth between $62 billion and $80 billion for the Australian economy.

2.57 DoTaRS says that the *transport* component of this contribution can be estimated from the National Accounts. The National Accounts, 1998-1999 estimated that transport industries involved in *direct* provision of infrastructure and service contributed around $19.8 billion, or 3.4% towards GDP. *Total* transport related activities (including storage, management and intelligent transport systems) contributed $31.4 billion annually, accounting for around 5.3% of total GDP in 1998-99.[48]

2.58 In 2000-2001 transport specific businesses contributed 4.9% or $31 billion to GDP and these figures excluded transport activity performed by other businesses. The transport sector provided 423,000 jobs, or 4.6% of total employment in 2000—2001.[49]

2.59 The Australian Freight Transport Logistics (FTL) industry is highly dependent on technology at every level of operation, from the delivery of services - including the movement, packaging and monitoring of goods - to business management and commercial transactions. DoTaRS states that:

> … the future competitiveness of the FTL industry will significantly hinge on how well the industry embraces new technologies to improve the efficiency of operations across all transport modes and provide value added logistics services.[50]

2.60 Adopting policies and implementing technologies that lead to more efficient transport and logistics industries are crucial to Australia's prosperity. As DoTaRS notes:

> The highly fragmented nature of the Australian Freight Transport Logistics industry is proving counter-productive in achieving a seamless logistics practice, and will affect Australia's international competitiveness in global market terms. Overseas buyers and sellers will increasingly look towards a transparent and integrated

48 http://www.dotrs.gov.au/transinfra/aftliaa/linking_ahead.htm' accessed: 25 September, 2002.

49 http://www.bte.gov.au/docs/trnstats02/trnstats.htm; accessed 30 September, 2002.

50 http://www.dotrs.gov.au/transinfra/aftliaa/linking_ahead.htm' accessed: 25 September, 2002.

> intermodal transport system, which will deliver their goods through seamless demand/supply chains.[51]

2.61 'Spin-off' benefits are anticipated from developing ITS in Australia. ITS is information, technology-based and typically involves high levels of value-adding. Information, technology-based industries are rapidly developing sectors of the global economy and it appears that there are emerging export opportunities for ITS technology. Proponents of ITS claim that the development of ITS systems in Australia will generate exports in skills and high technology products, such as computer software and systems to the Asian and other export markets. There is some evidence of this already, with SAAB-ITS and the New South Wales Road and Traffic Authority exporting locally developed ITS technology to many cities abroad.[52]

2.62 The evidence, from within Australia and also from abroad, is that ITS can provide considerable economic and social benefits at a relatively modest cost, while also providing substantial export opportunities.

51 *Transport Infrastructure Policy*, http://www.dotrs.gov.au/transinfra/aftliaa/linking_ahead.htm'; accessed: 25 September, 2002.

52 See Chapter 4.