10

Intelligent Tracking Technology

10.1 If Australia is to meet the challenge of its growing freight task, all opportunities to enhance the efficiency of its transport networks must be examined. The Committee felt that the advantages that intelligent tracking technology can offer for improving the coordination of freight movements, made it an essential part of its inquiry.

10.2 Intelligent Transport Systems[1] (ITS), of which intelligent tracking technology is an important component, can be used to improve the efficiency of rail, road and sea freight movements. The strategic implementation of ITS could provide a cost-effective means of streamlining transport network operations.

10.3 In its *Moving on intelligent transport systems* report in 2002, this Committee highlighted the economic, safety and security benefits of ITS. However, the Committee was concerned by the apparent lack of a coordinated approach to the development of ITS at the Commonwealth level. It concluded that a more active and structured approach was required, to ensure that the industry is able to take full advantage of the economic opportunities offered by this technology.[2]

10.4 In the 2004 *AusLink White Paper*, DOTARS recognised that:

> Estimated additional benefits associated with Intelligent Transport Systems in Australia are forecast to increase to $2.1

1 Intelligent Transport Systems consist of the application of computing, information and communications technologies to vehicles and networks that move people and goods. See http://www.its-australia.com.au/KMXServer3/Portals/0/ITSAHanbook.pdf, accessed 10 May 2007.

2 This report is available on the Committee's website: http://www.aph.gov.au/house/committee/trs/itinq/report/contents.htm.

> billion per annum by 2012. The Australian Government will consider technology-based solutions as part of, or as alternatives to, the construction of new infrastructure or as increases to the physical capacity of existing infrastructure.[3]

10.5 The Australian Government also committed to encouraging:

> …the development and take-up of new technologies which can potentially enhance transport efficiency, safety and security and sustainability through a mix of funding, facilitation and promotional measures. It will take a national approach to the application of existing and emerging technologies.[4]

10.6 Since then, many advances have been made.[5] However, there is still more work to be done on integrating and utilising ITS on Australia's transport networks, especially as the national freight task continues to grow.

10.7 Fremantle Ports observed:

> The more efficient systematic movement of containers is going to require much better information systems than we have in place at the moment. It is quite startling to see how much of the system still operates on a paper-trail basis with people conveying information over phones and things like that. That surprisingly even involves some of the large shipping lines, which are very large, sophisticated organisations in many respects. So if we want to achieve the sorts of high levels of efficiencies in the system which we all want to see there will need to be better information systems…
>
> [To achieve] proper control over empty running and those sorts of things. It is going to require some very sophisticated container tracking capability.[6]

10.8 Intelligent tracking technology is an essential element in the Warren Centre's *Sustainable Transport in Sustainable Cities* project. It said:

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3 Department of Transport and Regional Services, *AusLink White Paper: Building our National Transport Future*, June 2004, p.67.

4 Department of Transport and Regional Services, *AusLink White Paper: Building our National Transport Future*, June 2004, p.117.

5 See http://www.nationalits.com.au/ for information on developments in ITS in Australia.

6 Fremantle Ports, Transcript, 10 March 2006, Perth, p.44.

> …intelligent tracking technology is a vital component in the transport system to optimize loading, to reduce delays at terminals and to minimise time and journey length on the transport network.
>
> Intelligent tracking also could provide opportunities for a more effective cost recovery from the freight industry, providing a framework for actively relating infrastructure costs (both road and rail) to freight movement. While this is not a dominant aspect in modal choice (delivery timing and interface costs have higher effect on commercial issues), it is an aspect that clouds both industry and community perception of freight activity.
>
> Whether this should be tracking of all activity or only movements where operation conditions have been breached is a matter for private policy.[7]

10.9 The ARTC indicated that it "…would welcome initiatives promoting the use of intelligent tracking technology in Australia". It said:

> Electronic tracking of transport inventory in supply chain management would … offer the opportunity for more efficient utilisation of assets, improve industry responsiveness, and provide for more timely consignment tracking.[8]

10.10 The Australian Automobile Association (AAA) added its support when it noted:

> [I]n AusLink there is funding for transport development and innovation. We think some of that could be directed to a number of technologies to improve freight efficiency. It might be SMS messaging, intelligent signs or traffic information to reduce congestion et cetera.[9]

10.11 The Australian Electrical and Electronic Manufacturers' Association (AEEMA) commented:

> ITS offers the next major leap forward in transport in improving safety, convenience and productivity for commercial and personal travel. The emerging industry has already delivered practical benefits to transport, such as

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7 The Warren Centre, Submission 43, pp.3-4.

8 Australian Rail Track Corporation, Submission 68, pp.12-13.

9 Australian Automobile Association, Transcript, 7 September 2005, Canberra, p.2.

> traffic control systems … it is timely **now** to support the growth of this new sector with appropriate policies and programs.[10]

Rail

10.12 Australian rail operations remain heavily reliant on voice (radio) communication and trackside signals:[11]

> At present, about 95 per cent of train-driver authorisations are delivered by voice. The new [Advanced Train Management] system will see digital information delivered to a screen in the driver's cabin, essentially transferring train control from track signals to on-board computers linked to a central system by wireless communications.
>
> The system monitors trains constantly and a central computer directs speeds. But it is the efficiency gains that could transform rail's competitiveness to road. ATMS means trains travel in electronic blocks, ensuring a safe distance between other trains. While only one train can occupy prime-time track slots on north-south routes at present, electric blocks will multiply the slots by a factor of up to three.[12]

10.13 The current use of ITS in the grain supply chain is generally limited to the use of electronic ID tags on wagons to track movements across certain areas, for weighing and billing purposes. However, the Australian Wheat Board conceded:

> Intelligent tracking systems … would present opportunities for better coordination provided it was cost effective in the regional environment.[13]

10.14 When discussing signalling options, WestNet rail observed that:

> …there is currently no continuity of voice and data communications along the entire length of the line. That would be a significant part of that $20 to $30 million cost. You need continuous communication to have the in-cab signalling…

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10 Australian Electrical and Electronic Manufacturers' Association, Submission 91, p.6.

11 Business Review Weekly, *The same wavelength*, Vol. 28 (46), 23-29 November 2006, p.38.

12 Business Review Weekly, *The same wavelength*, Vol. 28 (46), 23-29 November 2006, p.38.

13 Australian Wheat Board, Submission 97, p.28.

> In-cab signalling would be a new technology in Australia. I am not aware of the cost differentials between that and traditional signalling.[14]

10.15 The Great Australian Trunk Rail System commented:

> The Australian Rail Track Corporation is doing excellent work on the latest technology in train traffic control. We will certainly be after the best train traffic control. It is probably going to be a GPS based service system.[15]

10.16 On the Kalgoorlie to Esperance line, an ITS has been installed, which enables GPS tracking of the location of individual trains.[16]

Road

10.17 The Australian Trucking Association (ATA) NT branch, claimed:

> …this technology is already in use across much of remote Australia. Demand will drive the development of ITS.[17]

10.18 However, P&O Ports commented:

> There has been a very poor take-up of technology in the road transport sector, a very limited use of GPS tracking.[18]

10.19 Comments by the ATA reflected scepticism about the value of ITS in some regional areas:

> We see no real advantage to truckers in a system that can track a container for instance and advise if the refrigeration unit is shut down between Alice Springs and Darwin. The drivers do regular visual checks anyway and attempt to effect repairs on the road. If the same container is on a train the reality is that there is nothing a forwarder can do anyway until the unit arrives in Darwin.[19]

10.20 This comment seems to ignore the main objective of using ITS technology – control and more efficient movement of cargo.

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14 WestNet Rail, Transcript, 9 March 2006, Esperance, p.70.
15 Great Australian Trunk Rail System, Transcript, 1 August 2006, Sydney, p.52.
16 WestNet Rail, Transcript, 9 March 2006, Esperance, p.70.
17 Australian Trucking Association, Submission 121, p.2.
18 P&O Ports, Transcript, 21 November 2005, Sydney, p.35.
19 Australian Trucking Association, Submission 121, p.2.

10.21 However, the Glenn Innes Section 355 Transport Committee saw economic potential in ITS for regional communities. It said:

> An advantage of intelligent tracking technology is [the] ability to be located anywhere. Intelligent tracking technology centres could be located in regional Australia thereby stimulating economic growth and development. When coupled with other transport initiatives such as intermodal freight hubs the benefits to regional centres are enormous.[20]

10.22 VicForests saw potential for the application of intelligent tracking technology to improve heavy vehicle productivity in the Gippsland region. It commented:

> VicForests sees that a set of fixed log truck scales in the far east of the study region will enable rapid and accurate weighing of the trucks accessing the State and local road networks. This has the ability to enhance the productivity of log trucks and VicForests commercial return, whilst reducing pavement wear. In addition, the weighing of loads will aid invoicing and improve payloads. This in turn will reduce the total number of vehicle movements and the weighing of loads, and assist in meeting mass management schemes in Victoria and where appropriate, in NSW. The likely total cost of a single facility is $250,000 with possible contributions from VicForest, VicRoads, RTA and AusLink as a demonstration project.[21]

10.23 P&O Ports informed the Committee that it had:

> …adopted the use of global positioning system (GPS) technology for managing the deployment of its truck fleet. The advantages are mainly in improved productivity and truck utilization, through real time tracking and locating of trucks. This provides real time management information of truck performance, driver working hours, site delays and proof of delivery. Though only recently installed, our intention is to use this technology to optimise container delivery planning and reducing the overall cost of transport for the benefit of our customers.[22]

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20 Glenn Innes Section 355 Transport Committee, Submission 87, p.6.

21 Councils of Gippsland, Gippsland Area Consultative Committee and South East Australian Transport Strategy Inc., Submission 62, p.30.

22 P&O Ports, Submission 54, p.5.

10.24 The AAA said that intelligent tracking technology could play a role in direct pricing regimes:

> [H]ave a look at Switzerland and Austria, you will find that they have GPS tracking technology now that can tell you where the truck is, how far it has travelled and what mass it is carrying and charge accordingly. We do that in telecommunications, gas and electricity. We charge access, we charge usage and we charge peak and off-peak. So it can be done.[23]

10.25 The ARTC argued that the live tracking of trucking systems would provide valuable input to guide road funding decisions. It claimed that:

> Certain parts of the existing road fleet have already invested in GPS tracking technology for fleet and supply chain management. This would suggest that, at least on a smaller scale, this adoption of this type of technology can be justified commercially, even in relation to benefits other than pricing and investment.[24]

10.26 Tracking technology could also address safety issues, for example by ensuring that drivers are adhering to the legislated driving hours.[25] In 2000, the predecessor of this Committee released its *Beyond the Midnight Oil* report on managing fatigue in the transport industry. The Committee recognised that driver fatigue could lead to significant economic, environmental and human costs. Today, with the combination of driver shortages and ever increasing freight demand, mechanisms to improve safety are important for ensuring the viability of freight movements by road and the safety of those in the industry.

Shipping

10.27 The just-in-time philosophy is prevalent in the freight transport industry. Improving coordination[26] between ships and reducing delays in arrivals and distribution, will help to challenge perceptions

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23 Australian Automobile Association, Transcript, 7 September 2005, Canberra, p.5.

24 Australian Rail Track Corporation, *Submission to Productivity Commission Inquiry into Road and Rail Freight Infrastructure Pricing*, May 2006, p.41.

25 Australian Rail Track Corporation, Transcript, 1 March 2006, Canberra, pp.11-12.

26 Evidence suggests that the degree of co-operation possible is constrained by ACCC and regulatory requirements.

of sea freight as slow and unreliable. Tracking technology can play a role in improving efficiencies in this area.

10.28 Tracking technology is being adopted by the shipping industry. However, due to the associated costs of the technology, its use is usually restricted to cargoes requiring security or enhanced control.

10.29 Fremantle Ports has in place Automatic Identification (AIS) technology for tracking sea freight movements. It acknowledged tracking technology's potential to improve supply chain efficiencies, including vehicle-booking systems to track expected land transport movements into the port. Fremantle Ports commented:

> …there will be increased use made of them—and the technologies are constantly improving—but at this stage it is probably not at a rate to make a huge difference, although looking at our port I believe the AIS is going to make a difference in security. Certainly the encouragement of the vehicle-booking systems has resulted in an improvement.[27]

10.30 The Port of Melbourne, as discussed in Chapter 3, is Australia's biggest container port; freight volumes, vehicular movements and information management pose a significant logistical challenge.[28]

10.31 A container tracking system has been introduced in Victoria as a first step towards developing more sophisticated information systems to improve overall efficiencies.[29] In 2003, the Victorian Government committed $4 million for the development of a Port of Melbourne Supply Chain Model under the Smart Freight Initiative:[30]

> [The Model] is used to map the technologies, users and import and export processes at the Port, demonstrating how and where stakeholders in the chain interact, the transactions which take place and the technology used.[31]

10.32 Of particular note, is the potential for the Smart Freight system to assist in the coordination of empty container movements. Smart Freight's Container Triangulation module collects information from exporters and importers about the requirements and availability of

27 Fremantle Ports, Transcript, 10 March 2006, Perth, p.44.

28 Intelligent Transport Systems Australia, *Annual Review 05/06*, p.34.

29 Fremantle Ports, Transcript, 10 March 2006, Perth, p.44.

30 Victorian Department of Infrastructure, http://www.doi.vic.gov.au/Doi/Internet/Freight.nsf/AllDocs/DD2F6F969F14B006CA256E050004EC90?OpenDocument, accessed 23 May 2007.

31 Intelligent Transport Systems Australia, *Annual Review 05/06*, p.34.

empty containers. Consequently, there is potential for that information to be shared, so that empty container movements can be matched and allocated according to export demand.[32]

ITS in Australia

10.33 One of the leading organisations responsible for the promotion of ITS in Australia, is Intelligent Transport Systems Australia (ITS Australia). It works to facilitate the development and deployment of advanced technologies across all modes of transport. It is a not-for-profit organisation that represents members of the ITS industry including government, consumers and academia. Its charter includes improving transport efficiency through the application of ITS to passenger and freight transport systems.[33]

10.34 In its 2005-06 Annual Review, ITS Australia acknowledged the efforts of the Australian and state governments in setting policy directions and committing funding to encourage and support ITS initiatives in transport planning.[34] ITS Australia's Board of Directors includes specialists from DOTARS and several equivalent state departments.[35]

10.35 The Committee was also pleased to note that ITS Australia was maintaining a close liaison with DOTARS:

> ITS Australia maintains regular communications with …[DOTARS] to monitor program development and to maintain an understanding of the value of ITS inputs in each [AusLink] program area.[36]

32 Victorian Department of Infrastructure, http://www.doi.vic.gov.au/DOI/Internet/Freight.nsf/AllDocs/A336F278D410B711CA257035001DAD48?OpenDocument#3, accessed 1 May 2007. This is also mentioned in the Chapter 6 discussion on empty containers.

33 ITS Australia, http://www.its-australia.com.au/KMXServer3/Default.aspx?tabid=104, accessed 23 May 2007.

34 Intelligent Transport Systems Australia, *Annual Review 05/06*, p.30.

35 ITS Australia, http://www.its-australia.com.au/KMXServer3/Default.aspx?tabid=52, accessed 23 May 2007.

36 Intelligent Transport Systems Australia, *Annual Review 05/06*, p.31.

Systems and technology

10.36 Various ITS applications are already being used in Australia.[37] Examples include, but are certainly not limited to:

- Weigh-in-Motion – using inroad sensors to screen heavy vehicles for mass limits, while on the move, thus reducing stops and improving efficiency;
- Safe-T-Cam – using infrared technology to capture pictures of passing vehicles, allowing license plate information to be recorded and used to track the journey speed and monitor driving hours and compliance of freight vehicles;[38]
- railway signalling systems – to detect and regulate train movements.

10.37 A significant national initiative is the Intelligent Access Program (IAP):

> …a regulatory and technical framework which uses satellite-based telematics (commonly known as Global Positioning Systems) to monitor and enforce the route compliance of heavy vehicles operating under specific permit conditions.[39]

10.38 The New South Wales Government has been working with Austroads to develop a national intelligent tracking model based on the IAP. It suggested that the IAP could potentially be used to:

- monitor the use of the road network in real time to ensure compliance with route conditions, and potentially speed and mass limits;
- reduce road safety risks related to fatigue management and driver hours;
- allow higher-productivity vehicles access to specific routes where there are no infrastructure constraints, e.g. bridge capacity limits;
- monitor higher mass limits on national highways and regional roads;
- monitor grain vehicle loading to receival points during the harvest period; and

37 See Appendix A of the *Handbook on Intelligent Transport Systems* for examples of emerging ITS applications, http://www.its-australia.com.au/KMXServer3/Portals/0/ITSAHanbook.pdf, accessed 10 May 2007.

38 Source: http://www.csiro.au/solutions/psah.html, accessed 16 May 2007.

39 New South Wales Government, Submission 96, p.17.

- develop an innovative approach to heavy vehicle road use pricing.[40]

10.39 Another significant project is the National Telematics Industry Initiative (NTII), which involves applying "…computing, information management and communications technologies to the vehicles and networks that move goods and people around Australia":[41]

> Telematics includes vehicle systems that combine the functionality of internal vehicle electronics with wireless and spatial communication systems. Such technology makes your transport safer, more secure and more efficient.[42]

10.40 In addition to commercial and safety benefits, telematics can also help reduce fuel consumption and road congestion and to improve the responsiveness of emergency services.[43]

10.41 The AEEMA-led NTII commenced in 2004. It is supported by key stakeholders, including ITS Australia and the Federation of Automotive Manufacturers. Over 130 organisations and businesses are listed on the 2006 Australian Telematics Industry Capacity Register.[44]

10.42 The project has received initial funding of $0.4 million from the Australian Government and up to $0.8 million of in-kind support from the private sector.[45]

10.43 AEEMA observed:

> The multi-dimensional approach taken by the project team to this initiative is commended to the Australian Government as an ideal template for the development of new knowledge-based industries in Australia. It is strongly suggested that any one of these approaches, in isolation, would not create a new

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40 New South Wales Government, Submission 96, p.17.

41 Australian Electrical and Electronic Manufacturers' Association, Submission 91, p.3.

42 Australian Electrical and Electronic Manufacturers' Association, http://www.aeema.asn.au/Default.aspx?ArticleID=153, accessed 10 May 2007.

43 For an outline of telematic services see Global Innovation, http://www.globalinnovation.com.au/docs/Telematics%20Handbook%202006.pdf, accessed 14 May 2007.

44 Global Innovation, http://www.globalinnovation.com.au/docs/Telematics%20Handbook%202006.pdf, accessed 14 May 2007.

45 Australian Electrical and Electronic Manufacturers' Association, Submission 91, p.3.

> Australian industry and address the fragmentation issue, a common theme across most Action agendas.[46]

10.44 It recommended a "…holistic industry development 'package'" that included:

- technological roadmap – to set directions and an overall framework for industry to work together on common goals;
- industry-led cluster – to address fragmentation, and enable co-operation and domestic and international knowledge sharing;
- national capability mapping – to assess market capabilities and direct the development of ICT strategies;
- industry demonstrator projects – to demonstrate industry capability, as a means of technology diffusion and gaining industry commitment;
- international benchmarking – linked to the technology roadmap and to identify potential offshore alliance partners;
- using the above activities to attract investment; and
- encouraging industry development and export connections to enhance export activities.[47]

10.45 AEEMA also recommended that:

> …due political recognition should be given by Australian and State Governments to the rapid emergence of the transport telematics sector globally and the specific opportunities for Australian industry.[48]

10.46 In its submission, AEEMA said it was confident that:

> …a niche market for intelligent transport systems and its associated technology area, telematics, can be established in Australia with appropriate industry and government collaboration.[49]

Committee Assessment

10.47 The Committee supports AEEMA's recommendation that:

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46 Australian Electrical and Electronic Manufacturers' Association, Submission 91, p.4.
47 Australian Electrical and Electronic Manufacturers' Association, Submission 91, pp.4-5.
48 Australian Electrical and Electronic Manufacturers' Association, Submission 91, p.5.
49 Australian Electrical and Electronic Manufacturers' Association, Submission 91, p.2.

> The Australian Government should consider its role in working with industry to create the 'ultimate solution', through a cooperative system that allows industry access to necessary infrastructure and government-collected traffic data.[50]

10.48 The Committee acknowledged ITS Australia's review findings, which were complimentary about the Australian and the state governments' policy and funding commitments for ITS development and application.[51]

10.49 The Committee also recognised that industries relying on innovative technology tend to change rapidly. Consequently, evidence received on this topic in the course of the inquiry may have already been addressed by government or industry initiatives.

10.50 Overall, the Committee felt strongly that ITS has a significant part to play in the future efficiency and safety of the entire Australian transport network. To meet the challenge of the growing freight task, government and industry must explore cost-effective, and regionally appropriate, intelligent tracking technology as part of corridor and national strategies.

10.51 In particular, the Committee commends the work undertaken by the NSW Government and Austroads to develop a national model for intelligent freight tracking. It considers that this initiative should be encouraged and supported – with the aim of quickly developing, and implementing, a nationally applicable standard.

10.52 The Committee stresses that the collection of freight transport data,[52] by all levels of government and commercial operators, must be an integral part of these development processes and the ongoing operation of the national freight tracking model subsequently adopted. Further, there must be an onus on all transport operators – including commercial operators – to provide data collected to the Australian and State Governments, to be used to more accurately assess freight task requirements and to facilitate future transport network planning.

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50 Australian Electrical and Electronic Manufacturers' Association, Submission 91, p.7.

51 Intelligent Transport Systems Australia, *Annual Review 05/06*, p.30.

52 The discussion on transport data in Chapter 2, highlights the problems that gaps and lack of current data on the freight transport task pose for those trying to assess current movements and capacity and plan for the future.

10.53 It is the view of the Committee that the Australian Government will need to take a leadership role, in conjunction with state governments and industry, to bring the development of a national model, with its complementary data collecting role, to an effective starting point.

Recommendation 24

10.54 **The Committee recommends that the Australian Government provide financial support for the development and implementation of a national intelligent freight tracking model, and urgent funding for a small number of demonstration projects under the national model.**