National in-vehicle telematics strategy: The road freight sector

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NTC AUSTRALIA

National Transport Commission

Contents

National Transport Commission (NTC)

In-vehicle telematics: A plan for the road freight sector 2010 – 2030

1. Overview

In-vehicle telematics

In relation to the road freight sector, in-vehicle telematics encompasses the electronic monitoring, management and regulation of vehicles, their devices and their loads. In-vehicle telematics can include:

- devices that will improve business efficiency
- devices that will improve safety performance such as better managing speed compliance and driver fatigue
- devices that will improve the environmental impact of freight movement
- devices that will manage the interaction between the vehicle and the infrastructure to enable better access to the road network.

In-vehicle telematics have developed beyond early, stand-alone devices (for example, vehicle-location tracking) to more interactive, intelligent and event-driven systems. In other words, the technologies are increasingly forming part of transport management systems that monitor, communicate, evaluate and respond to events dynamically.

Some sectors of the supply chain are already investing in these technologies to drive commercial benefits such as improved asset management. In-vehicle telematics also have the potential to proactively manage fatigue and speed compliance, as well as improve access to the road network.

Ultimately, increased uptake of in-vehicle telematics will support transport productivity, safety and environmental objectives being pursued by governments (see Appendix A – Australian Transport Council's (ATC) vision and objectives).

The road freight sector has not, however, embraced new and innovative technologies as fast or as wholly as many other industries. As a result, the full economic, social and environmental benefits to the Australian community have not been realised.

Implementation of a national strategy, supported by industry and government, would help to drive the transition to the wider use of technology for the benefit of all Australians. It will aim to better align current government and industry initiatives, based on shared objectives, policy principles and responsibilities.

While in-vehicle telematics has broad application in all types of vehicles (trucks, buses, light vehicles, cars and trains), the focus in this strategy is on the road freight sector. This document has been developed through consultation with road freight operators, unions, suppliers and governments.

It is envisaged the strategy will be regularly reviewed to ensure it remains relevant for governments and industry.

2. A vision for in-vehicle telematics

In 20 years' time the vision for in-vehicle telematics in the transport industry is:

Voluntary uptake of effective new in-vehicle technologies has allowed 90 per cent of the road freight sector to benefit from safety, operational and environmental improvements in meeting both commercial and regulatory compliance needs. Data is routinely shared between supply chains and their participants, driving efficiencies in scale and productivity, and is being used to proactively manage compliance risks.

In-vehicle telematics in the road freight sector has made a significant contribution to Australia's transition to an efficient and safe low-carbon economy, in spite of the increasing growth in freight movements.

Widespread use of in-vehicle telematics has reduced the need for roadside enforcement and delivered better levels of regulatory compliance. This has led to the minimisation of enforcement intervention against low-risk compliant operators and allowed enforcement to be more closely focussed on persistent and systematic non-compliant, high-risk operators.

CASE STUDY: Enabling more efficient, low carbon supply chains

Woolworths' transport division has committed to reducing the environmental impact of its fleet, including a goal to reduce carbon dioxide emissions by 25 per cent per carton by 2012. Strategies to achieve this target include investment in transport management systems to reduce truck trips and drive supply chain efficiency.

The rollout of Woolworths' Metro Transport Model in 2009 involved specifically designed trailers and technology to plan, optimise and track outbound freight movements. The technology optimises transport movements from distribution centres (DCs) to stores and utilises truck backloading capacity.

Reported benefits include "real time" visibility of the vehicle fleet which enables proactive management of deliveries into stores.

Source: Woolworths 2010

3. A shared national objective

Industry's use of in-vehicle telematics is primarily driven by commercial benefits as well as improved safety for employees. Governments' goal is to support the achievement of regulatory policy objectives (see Appendix A) and to encourage the uptake of in-vehicle telematics to deliver benefits to the community.

It follows the objective of this strategy, which is to:

Increase the potential for in-vehicle telematics to deliver new or greater benefits (better safety, productivity and environmental outcomes) to users and the community through a partnership between industry and government.

4. What this plan will do

This 20-year plan will provide a starting point and future vision for the forecast growth of in-vehicle telematics in the road freight sector. This plan only deals with a small part of the larger opportunities in intelligent transport systems and logistic and vehicle technology applications. It should be seen in the context of the broader national coordinated approach for the whole transport and logistics industry. This plan focuses on in-vehicle telematics for the road freight sector only. It will establish a set of principles in order to encourage wider adoption within industry. The plan focuses on three key outcomes: a safety focus, protecting the environment, and improving productivity.

CASE STUDY: Industry embracing technology

Lindsay Fox told the Asia Pacific Economic Cooperation's (APEC) Supply Chain Connectivity Symposium in Singapore in May 2009 that 'black box' technology for trucking management was crucial in promoting efficiency and safety.

"We have the technology to automatically track and measure truck movements. Drivers in charge of highly sophisticated vehicles should not have to put up with outdated paper-based record keeping. Not when we have the IT and satellite technology to record and report real-time movements," he said.

5. Opportunities and threats

The use of in-vehicle telematics provides significant opportunities for industry, governments and the broader community as well as posing a number of threats.

Opportunities for …

The road freight sector	Governments

In-vehicle telematics has the potential to improve the way industry operates. In the road freight sector it is an enabler of:
• supply chain productivity through:
  • improved management and asset coordination
  • better access to infrastructure
  • visibility of inventory movements along the supply chain
  • information to proactively manage driver behaviour, vehicle speeds, loading, engine performance and fuel consumption.
• better management of regulatory and compliance obligations.
	In-vehicle telematics opens up opportunities to achieve policy objectives through regulation, including:
	• improved road safety through more effective compliance monitoring (for example, speed and driver fatigue management)
	• better management and safer use of vulnerable infrastructure (for example, matching vehicles with roads and bridges)
	• smart compliance tools to reward 'good operators' and identify non-compliant operators
	• better management of the environment (for example, low emission zones near communities heavily exposed to truck movements)
	• better access to infrastructure and resource-use efficiency (for example, potential road pricing applications and higher axle weights).

Benefits to the community…

Benefits from the use of in-vehicle telematics will flow through to the community. These could include:

- more cost-efficient freight transport, reducing the cost of goods and services and improving the competitiveness of Australian exports
- reduced road deaths and injuries through improved safety compliance and decreased exposure to crash risks
- fewer truck trips will lower energy use and vehicle emissions.

Threats for …

The road freight sector and governments

- Industry may be unable to self-regulate supply chain information coordination.
- A lack of policy certainty could constrain industry investment in in-vehicle telematics.
- There are potential financial impacts on business, particularly if telematics use is mandated
- Significant ‘sunk’ financial investments in technology may not be recognised by government policy
- Multiple 'black boxes' could be required in vehicles
- Fragmented state-driven policy responses may create regulatory burdens
- Prescriptive standards may limit the market and innovation over-time
- Industry is not well-informed about options and benefits of technology
- There may be inappropriate enforcement and privacy issues (see case study below)

The new frontiers opened up by the use of in-vehicle telematics in the road freight sector will present difficult challenges and significant opportunities for governments, industry, unions and the broader community (see below). A national strategy is critical to help overcome the challenges and maximise the opportunities.

CASE STUDY: Enforcement equity concerns

Australian Road Train Association Executive Director John Morris has raised concerns about ‘Big Brother’ style enforcement linked to in-vehicle telematics (for example global positioning systems (GPS)).

"Recently proposed (road train) trials ... outlined as one of its compulsory items the application of global positioning systems tracking devices," he told Australasian Transport News (ATN).

"The proposal appears to have far too many treacherous precedents encompassed in it. Live spy-in-the-sky stuff."

Morris said operators are worried about being prosecuted for small breaches.

"Some operators are now considering removing the GPS units from the trucks to avoid petty infringement from the enforcement agencies, a situation that takes away a valuable tool in general fatigue management."

Source: ATN 2005

6. National policy principles

An overarching set of national principles will help to better align and guide in-vehicle telematics initiatives driven by government and industry with a national objective.

The following are based on principles endorsed by the Australian Transport Council (ATC) as part of the Australian Strategic Transportation Agenda for Research and Technology (ASTART). They are consistent with the principles being developed for a policy framework for ITS in Australia. The National Transport Commission (NTC) proposes the following principles to improve the safety, productivity, efficiency and environmental performance of the transport and logistics industry:

1. The role of business is to develop **innovative technological solutions** – the private sector has the ability to drive the development of new technologies, and the incentive and resources to innovate in-vehicle telematics.
2. The role of governments is to provide **policy certainty by setting the regulatory framework**, creating an environment for business to invest with confidence.
3. Technology is a tool to **enable policy;** policy should not be designed to fit a technology.
4. Interoperability standards and platforms must be **public, transparent and performance based**. They should encourage innovation and facilitate multiple uses. Governments should provide standards and policy directions to help facilitate supply chain interoperability and in-vehicle telematics uptake. [1]
5. Telematics-based compliance monitoring should be **voluntary** wherever practical.
6. Uptake by industry should be **encouraged** rather than compelled**.**
7. Mandating in-vehicle telematics applications requires transparent and consistent **evaluation** considering the needs of all relevant stakeholders in accordance with best practice regulatory principles. It should ensure any new technological requirements delivers **demonstrable benefits to individuals and the community.**
8. **National** approaches for telematics use – national consistency delivers economies of scale and drives greater uptake within industry.

***Note**: [1] there should be transparency of existing tamper proof standards and data protection.*

CASE STUDY: The Intelligent Access Program

Governments have made a significant investment in the Intelligent Access Program (IAP) and the establishment of Transport Certification Australia (TCA). The IAP is a voluntary program that provides improved access to the road network in return for monitoring of compliance (requiring evidentiary data) with specific access conditions.

The IAP provides an example of how governments and private sector telematics service providers and transport industry have worked collaboratively to establish:

- a policy and regulatory framework,
- a performance based functional and technical platform,
- an operational environment; and
- a commercial setting

for the management of road access applications using vehicle telematics.

Collectively these provide a national framework, capable of delivering both regulatory and commercial ITS initiatives, and approved by the Australian Transport Council.

Examples of how the IAP is helping the transport sector and governments to work together to deliver improved network access and increase productivity can be found at http://www.tca.gov.au

These include BevChain Logistics, a joint venture between Linfox Logistics and brewer Lion Nathan which has used the IAP to gain access to a key 11 km stretch of local road in Brisbane for specially built higher productivity quad-axle PBS vehicles. This has enabled a tonnage gain of 14.6% per load, equating to an extra 4 pallets each load.

The trade media has reported that some carriers have not embraced the productivity reform because of the compliance costs imposed by the IAP and uncertainty of access. In a public statement, Scotts Transport reported that opportunities for Higher Mass Limits and load maximisation have diminished due to “changes in state authority standards where benefits were outweighed by compliance costs” (Scotts Transport 2009).

7. What is happening now?

The national strategy has been informed by an analysis of the external environment and current initiatives being led by industry and governments, and by submissions received from industry, government and the public during consultation.

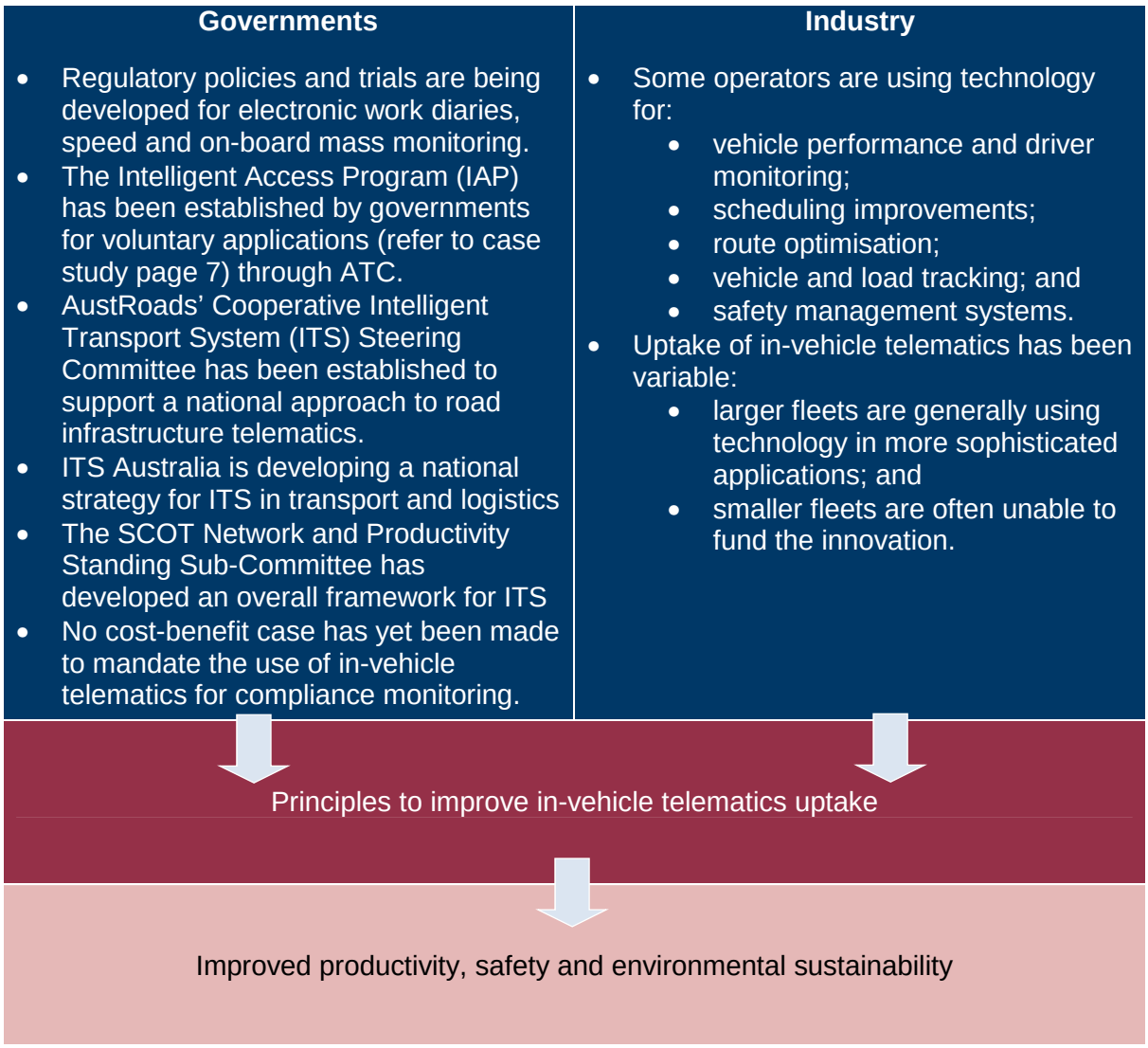
External drivers

The use of in-vehicle telematics by the road freight sector is influenced by a range of external demographic, technological, economic, safety and environmental factors (see Appendix B). Some key themes include:

- a fragmented and competitive road freight industry, with low take up of in-vehicle telematics
- growing pressure from purchasers of freight transport to improve supply chain cost efficiencies
- rapid technology innovation, with wider network coverage, speed and reliability
- improved road safety and reduced carbon emissions are major national priorities
- government resources are focussed on smarter compliance and enforcement
- the road freight task is growing at a faster rate than the economy
- pressure on governments to invest in infrastructure and/or better utilise existing assets.

Current initiatives for in-vehicle telematics

The national strategy aims to better align current government and industry initiatives (below) based on shared objectives and policy principles.



8. A shared responsibility – industry and government

While industry and government have distinct roles to play to help drive uptake of in-vehicle telematics, it is important they work together in partnership to achieve the best outcomes.

Role of industry

Suppliers are already developing market-based in-vehicle telematics solutions, but a favourable benefit-cost ratio has been challenging for many smaller transport operators to identify.

The road freight sector is investing in technology where a clear benefit-cost can be identified, which has primarily been to drive improved commercial cost efficiencies. However, the complexity of supply chains and the fragmented nature of the industry have meant that many small operators are unable to clearly identify commercial and/or regulatory compliance benefits.

Industry can assist through cooperative action to develop standards and share information along the supply chain, ensuring the benefits of technology investments for all parties are clearly identified.

CASE STUDY: Supply chain facilitation

Victoria's Connect Freight program aims to improve efficiency and reduce congestion in the Port of Melbourne supply chain. The program has already delivered real-time travel, queuing and delay information via website, SMS and email updates for fleet operators and truck drivers. A number of trials are also underway to drive container movement efficiency and pilot online tools to assist supply chain parties to share key business information quickly and easily in a standard electronic format.

Role of governments

Governments can address supply chain market failure and enabling regulatory policies by encouraging the take up of in-vehicle telematics. Below are some examples of where government can play a role.

Supply chain market failures

The benefits of in-vehicle telematics are linked to industry take up (wider use) and 'network effects' (sharing the data with other parties in the supply chain). The perceived benefits, however, may be unevenly shared and less convincing for smaller operators. Cooperative action to share information equitably along supply chains is also costly to organise.

Inadequate data and commercial disincentives to share information (e.g. visibility of vehicle asset tracking) can result in poor decision-making which can constrain overall supply chain efficiency. The NTC believes transparent transfer of information along the supply chain could be enhanced by the introduction of common information technology standards and platforms. In-vehicle telematics is one such example.

Governments can assist by helping industry to better understand the benefits of in-vehicle telematics and, where necessary, by facilitating the sharing of information along Australia's supply chains.

Regulatory applications

The road freight sector has traditionally relied on paper-based systems to manage truck speed, fatigue and mass compliance risks. As the industry invests in technology-based systems, an opportunity exists to integrate their use for regulatory and compliance management purposes.

The role of government to influence technology uptake for regulatory purposes is, however, potentially contentious (e.g. financial impacts, equity of enforcement, privacy concerns and regulatory burdens).

Some in-vehicle telematics work is already being undertaken in specific areas of regulation, such as vehicle access (e.g. for Higher Mass Limit vehicles in some states) and fatigue, speed and mass compliance, but there is no overarching policy to drive consistency between those and potential new responses.

For the broader benefit of the economy, society and the environment, regulatory policy should facilitate in-vehicle telematics take up. It is clear that in order to achieve the necessary take up to make in-vehicle telematics beneficial for the broader road freight sector, government and industry will need to work together in partnership.

CASE STUDY: Proactive management of fatigue compliance

Energy distributor Cootes Transport Group uses technology to roster drivers, schedule loads and manage regulatory compliance. Drivers swipe their identification tag and key in 'events' – like the arrival at a terminal to load. Global positioning system data is used to verify driver movements. If a driver fails to take a mandatory rest break, a prompt will appear on their personal digital assistant (PDA).

Cootes General Manager Greg Niven said an electronic system allows the operator to proactively manage compliance with fatigue laws in real time, rather than responding to events after they have happened. Yet, drivers are still required to complete paper work diaries because their electronic systems are not formally recognised by governments.

9. Assessment of strategic options

Possible responses to meet the objective of increased uptake of in-vehicle telematics range from business as usual to a strong interventionist approach by governments.

Option 1 Business as usual	Option 2 Government and industry partnership	Option 3 Government intervention
Continue approach of non-intervention into the market and do not undertake initiatives and regulatory reforms to encourage take-up of in-vehicle telematics. This includes: • inconsistent and *ad hoc* adoption of existing programs • evaluate new regulatory applications (including potentially mandated applications) on an ad hoc basis without providing a clear road map of future uses • do not take initiatives to encourage take-up of telematics • do not engage actively with industry and provide clarity about existing standards and requirements. Benefits: Least cost option in short term. Challenges: Slow uptake of telematics, loss of efficiency, productivity and safety gains, risk of inefficient proliferation of single-function devices in vehicles.	Governments and industry agree on initiatives to promote in-vehicle telematics take up including: • identifying opportunities and encouraging innovative solutions; • facilitation of industry efforts to implement coordinated supply chain solutions • foster stronger linkages between the road freight sector and the telematics industry. Governments provide: • clarity about priorities and plans for regulatory applications (what, when and how) • consistent and transparent cost-benefit justification for requiring the use of in-vehicle telematics for regulatory purposes • performance based standards and specifications that do not constrain innovation • certification of suitable technology systems • transparency about existing standards underpinning regulatory applications of telematics • opportunities for industry to contribute to the development of future standards for the regulatory use of in-vehicle telematics that support both government and industry objectives. Benefits: Encouraged uptake and industry participation and innovation to deliver efficiency, productivity and safety gains. Challenges: Limited government flexibility and greater co-operation with industry required.	Governments move to mandated use of in-vehicle telematics based on particular technology or systems without industry input. • Governments' mandate that a specific solution be used in particular applications (for example all heavy vehicles to be fitted with a specific device for compliance monitoring and meeting regulatory requirements such as speed, fatigue, or mass and loading). • Industry is not allowed to propose alternative solutions for new regulatory applications. • Performance-based specifications are more prescriptive in nature and are developed by government for mandatory use. • There will be comprehensive mandated coverage of in-vehicle telematics devices to remove the need for paper-based compliance approaches, particularly at the roadside. Benefits: Clear signals sent to vendors and users about what systems were 'acceptable'. Challenges: Reduced industry capacity to innovate and create technology which also encourages and supports other commercial benefits. Risk of sole focus on meeting compliance requirements, missing opportunities to deliver other benefits for the Australian economy.

10. The way forward

The partnership approach (described as Option 2) is to be adopted as it best achieves the identified policy principles.

This is consistent with recommendations made by NTC's supply chain pilot studies (NTC 2009). These studies concluded that supply chain participants should initially be given the opportunity to correct any supply chain information failures through self-regulation. In working together, governments and industry should seek to:

1. Remove barriers and any form of market or policy failure necessary to assist users of telematics applications to obtain benefits from uptake of new services and products, and providers of telematics to achieve adequate return on their investment.
2. Promote standards development and interoperability protocols through a government industry partnership, with a focus on removing barriers and market and policy failures, as well as promoting second-order benefits.
3. Identify large and multi-user applications which can be brought-to-market by major stakeholder(s) to grow scale and scope in the telematics market, as a contribution to an industry and market development program.
4. Ensure that any application which has a regulatory function, whether mandated or otherwise, is subject to normal COAG regulatory assessment principles.
5. Encourage the pursuit of telematics services, standards and protocols that deliver additional benefits to industry and the community

Supply chain market failures

In 2008, ATC asked the NTC to perform a supply chain monitoring role. In performing this function, the NTC will identify market failures, including possible opportunities for improved cooperation through shared information technology platforms and interoperability along supply chains. This will involve working collaboratively with industry and Australian governments (Federal, state/territory and local) to promote cooperation by developing interoperability standards.

Regulatory applications

A series of actions are set out in Section 11 for industry and government to undertake to promote a broader uptake of in-vehicle telematics. These actions are consistent with the draft national policy principles for in-vehicle telematics use (as identified in *In-Vehicle Telematics: Informing a National Strategy* (NTC 2010)).

Regulatory applications involving in-vehicle telematics must be evaluated in terms of best-fit solutions, that is, rather than assuming any pre-existing telematics model should automatically apply. This will ensure that the telematics platform underlying the Intelligent Access Program functions as an enabler of technology uptake and does not inadvertently become a barrier to technological innovation. Larger transport operators have also been supporting the take up of telematics to allow them to better manage their compliance needs for fatigue and speed.

CASE STUDY: Mass compliance in grain transport

NTC engaged parties in the grain supply chain to assess transport mass compliance practices. Evidence suggests the introduction of Chain of Responsibility (CoR) laws has significantly reduced the frequency of severe overloading. Many grain transport operators are now using on-board mass measurement devices (below right) to optimise their loads and comply with mass limits.

Industry consultation identified the potential for regulatory recognition of (telematics and manual) on-board devices, including the use of industry codes to provide prima facie evidence of taking 'reasonable steps' under CoR to comply and the certification of systems to migrate from paper-based mass management schemes.

11. Outcomes and actions

	Action	Objective	Outcome	Responsibility	Timing
1.	Publish national performance-based standards for electronic work diaries (EWD) and on-board mass monitoring (OBM).	Promote interoperability and consistent communication between technologies. Provide confidence that in-vehicle telematics devices adhere to minimum performance standards.	Productivity and safety	Austroads (EWD) Transport Certification Australia (OBM)	2011 2012
2.	Clarify certification policy and process of suitable technology systems.	Allow secure electronic alternatives to the paper-based National Heavy Vehicle Accreditation Scheme.	Productivity	National Heavy Vehicle Regulator and NTC to develop in partnership with industry.	2015
3.	Update mass regulations to provide a positive duty for managing compliance (consistent with fatigue and speed regulations).	Allow operators to demonstrate compliance risks are being managed proactively, including through in-vehicle telematics use.	Productivity and safety	Government with industry consultation in National Heavy Vehicle Law.	Post 2013
4.	Allow the introduction of industry codes of practice for in-vehicle telematics.	*Prima facie* evidence that in-vehicle telematics systems effectively manage transport compliance risks.	Productivity	Industry to develop in partnership National Heavy Vehicle Regulator and NTC.	Post 2013
5.	Develop an enforcement policy to support in-vehicle telematics use.	Consistent and equitable enforcement practices to ensure telematics use is not discouraged or penalised.	Safety	NTC and industry to develop in partnership with National Heavy Vehicle Regulator.	Commence 2013
6.	Establish enforceable voluntary undertakings for the fitting of in-vehicle telematics systems to monitor compliance.	Voluntary agreements between regulators and operators as an alternative to litigation.	Safety	Government engage industry on changes to Compliance and Enforcement laws.	Commence 2013

7.	Develop a framework for assessing administrative costs before requiring in-vehicle telematics.	Demonstrate clear, transparent and consistent benefits to avoid unnecessary cost or cross-border technology barriers.	Productivity (administrative savings)	National Heavy Vehicle Regulator to engage industry on guidelines for cost-benefit assessments.	Post-2013
8.	NTC to monitor supply chains for inefficiencies and market failures as requested by the Australian Transport Council.	Promote effective supply chains which deliver productivity gains to the nation.	Productivity	National Transport Commission with support from industry.	2011-12

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Appendix A: ATC's vision and objectives

ATC's vision for transport in Australia

"Australia requires a safe, secure, efficient, reliable and integrated transport system that supports and enhances our nation's economic development and social and environmental wellbeing."

ECONOMIC: Promote the efficient movement of people and goods in order to support sustainable economic development and prosperity.

SAFETY: Provide a safe transport system that meets Australia's mobility, social and economic objectives with maximum safety for its user.

SOCIAL: Promote social inclusion by connecting remote and disadvantaged communities and increasing accessibility to the transport network for all Australians.

ENVIRONMENTAL: Protect our environment and improve health by building and investing transport systems that minimise emissions and consumption of resources and energy.

INTEGRATION: Promote effective and efficient integration and linkage of Australia's transport system with urban and regional planning at every level of government and with international transport systems.

TRANSPARENCY: Pursue transparency in funding and charging to provide equitable access to the transport system, through clearly identified means where full cost recovery is not applied.

NTC's objectives for improved safety, productivity and environmental outcomes are aligned and contribute to ATC's national transport objectives.

Appendix B: Environmental scan

INDUSTRY

Demographics - In Australia the average age of a truck driver is 54, and they are overwhelmingly male. Industry is looking to encourage younger participants, and a greater number of women, who are already familiar with the use of technology.

Fragmented Industry - The heavy vehicle industry – made up of large, small and medium fleets, owner-drivers and ancillary operations – is highly fragmented and competitive. Little collaboration exists between operators. Many operators are constrained from investing in new technology, where the benefits are not clear and significant.

Customer Demand - Supermarkets are now open seven days a week, and in many cases, 24 hours a day. Supply chains such as these demand smaller and more regular 'just-in-time' deliveries of product. Freight customers view in-vehicle telematics as an important way for transport operators to 'value add' their service provision. It offers customers inventory tracking and better 'end to end' accountability.

TECHNOLOGY

New Technology - The use of satellite location tracking technology integrated with mobile communications and back office systems is developing at a very fast rate. What was new and high cost yesterday is fast becoming standard (e.g. intelligent vehicle systems that automatically control vehicle operation in response to external condition monitoring).

Applications - Stand-alone satellite navigation applications are heavily utilised by many trucking fleets to increase operating efficiency, improve customer service and provide a safe working environment. An industry of service providers has been developed that provides telematics solutions to transport operators.

Network Availability - Network coverage and reliability is increasing, enabling more people in more places to utilise telematics. This includes phones, remote internet access, etc. The combination and integration of different communication technologies with higher bandwidths allows telematics users to take the full advantage of its potential overcoming historical communication limitations.

SOCIAL

Road Safety - Better road safety outcomes are a major national priority. Telematics provides means to more efficient and effective enforcement of compliance with road use laws, such as speed management and electronic work diary record keeping to manage the risk of driver fatigue.

ECONOMIC

Smarter Infrastructure Use - Road congestion is a significant cost to a nation's productivity. Telematics are being applied internationally as a means to make existing transport infrastructure work harder and more efficiently.

Efficiency - As part of a Transport Management System, telematics improves the capacity utilisation, coordination and monitoring of goods through the supply chain. The same technology can also demonstrate compliance with government regulations more efficiently and effectively.

ENVIRONMENTAL

Climate Change - The broader community has an increased level of environmental awareness and the transport industry is the second largest carbon emitter. A potential Carbon Pollution Reduction Scheme (CPRS) will increase pressure on the transport sector for further supply chain efficiencies.

Oil Insecurity - Oil production is widely considered to have passed its peak. The road freight transport industry will need to look to alternative fuels, and consider more efficient engine and vehicle uses. Improved supply chains can facilitate less fuel use and lower emissions.

REGULATORY

Enforcement - Governments are required to protect the safety of their citizens and are looking for smarter ways to undertake compliance and enforcement of road freight laws. A greater focus is being placed on third party compliance audits (and potentially electronic monitoring) alongside better targeted roadside enforcement.

Infrastructure Use - Governments have the potential to use in-vehicle telematics to improve road access for 'high risk' vehicles while protecting vulnerable road and bridge infrastructure (for example access to parts of the network that are otherwise unavailable).

Infrastructure Investment - The capacity of governments to invest in large new infrastructure projects is constrained by budgetary and fiscal pressures. Governments are also using public and private investment models when building new infrastructure and these models may involve a user-pays system. Any future move to demand management road pricing systems (for example possible road user charging in recent tax review: *Australian Future Tax System*) may require telematics architecture.

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