Review of Regulatory Telematics Report

March 2018

NTC AUSTRALIA

National Transport Commission

Report outline

Title	Review of Regulatory Telematics
Type of report	Report
Purpose	To make findings and recommendations to increase the uptake of in-vehicle telematics for regulatory purposes in Australia, with a particular focus on telematics regulated by the Heavy Vehicle National Law (HVNL).
Abstract	The report reviews the role of in-vehicle telematics and identifies opportunities to increase the use of telematics for regulatory purposes. The review focuses on telematics regulated by the HVNL, including the Intelligent Access Program (IAP) and the Electronic Work Diary (EWD), but also evaluates the role of regulatory telematics in passenger transport, taxis, alcohol interlocks and chain of responsibility. The review evaluates existing national strategies that relate to in-vehicle telematics, and makes 30 findings informed through targeted consultation with government and industry. The report proposes six recommendations to increase policy certainty and the uptake of regulatory telematics.
Key words	Telematics, heavy vehicle, enforcement, compliance, Intelligent Access Program, IAP, Electronic Work Diary, EWD
Contact	National Transport Commission Level 3/600 Bourke Street Melbourne VIC 3000 Ph: (03) 9236 5000 Email: enquiries@ntc.gov.au www.ntc.gov.au

Contents

List of tables

List of figures

Executive summary

Over the past 15 years, telematics has developed from stand-alone single-use devices to interactive, intelligent and event-driven systems. Telematics are being used in the transport sector to optimise the efficiency of commercial operations by collecting diagnostic information about harsh braking, engine performance and routing, and to monitor drivers and the driving task. Telematics can also be used to underpin regulatory activities, such as granting network access, recording hours of work and rest, or recording on-board vehicle mass.

There are two telematics applications in the Heavy Vehicle National Law (HVNL): the Intelligent Access Program (IAP), which is based on government certification of service providers by Transport Certification Australia (TCA) and has been available since 2009; and the Electronic Work Diary (EWD), which is based on approval by the National Heavy Vehicle Regulator (NHVR) and is anticipated to be available in the market later in 2018.

In September 2017, the Transport and Infrastructure Senior Officials' Committee (TISOC) asked the National Transport Commission (NTC) to review regulatory telematics. The purpose of this review is outlined in the Terms of Reference (Appendix A) and includes:

- reviewing the role of regulatory telematics, including governance
- assessing the currency of existing strategies
- recommending how widespread use of telematics could be adopted using systems currently available and providing models for adoption.

The review has been undertaken in consultation with the Commonwealth Department of Infrastructure, Regional Development and Cities, state/territory departments and road transport agencies, the NHVR, TCA, police, heavy vehicle operators, peak bodies, and service providers (including service providers that are IAP certified, and service providers that are not IAP certified). The review relied on desktop research, information requests and targeted interviews. The NTC conducted a total of 26 interviews.

The review recommends a phased reform program

In Australia two different approaches are in use or being developed to support the use of telematics data for regulatory purposes. These models provide different benefits and disadvantages. The IAP model seeks to regulate service providers and in doing so increase certainty and confidence for government agencies that electronic records are accurate and can be relied upon for prosecution. The EWD model focuses on regulating heavy vehicle operators rather than service providers. The NHVR sets minimum technical standards that operators are responsible for meeting. The EWD approach is less controlled but is expected to facilitate innovation, be more cost effective and help promote increased voluntary take up by heavy vehicle operators.

These models represent very different approaches on how best to use telematics data to support government's desired regulatory objectives. There is clearly a need to balance evidentiary certainty with cost and innovation. Furthermore, there needs to be benefits for industry in return for using regulatory telematics, otherwise the uptake of the technology will remain marginal, and the community will not benefit from improved safety, productivity and environmental outcomes, as well as regulatory efficiencies.

This review has examined the current state and identified that the emergence of two models has generated uncertainty in the market. It is not sustainable to have two parallel models for regulatory telematics, and our vision for the future is the development of one legislated model that is flexible, technology- and application-neutral and can accommodate higher levels of assurance if necessary.

On balance, we believe there are several short-term measures that could incrementally improve the existing IAP model's performance and efficiency.

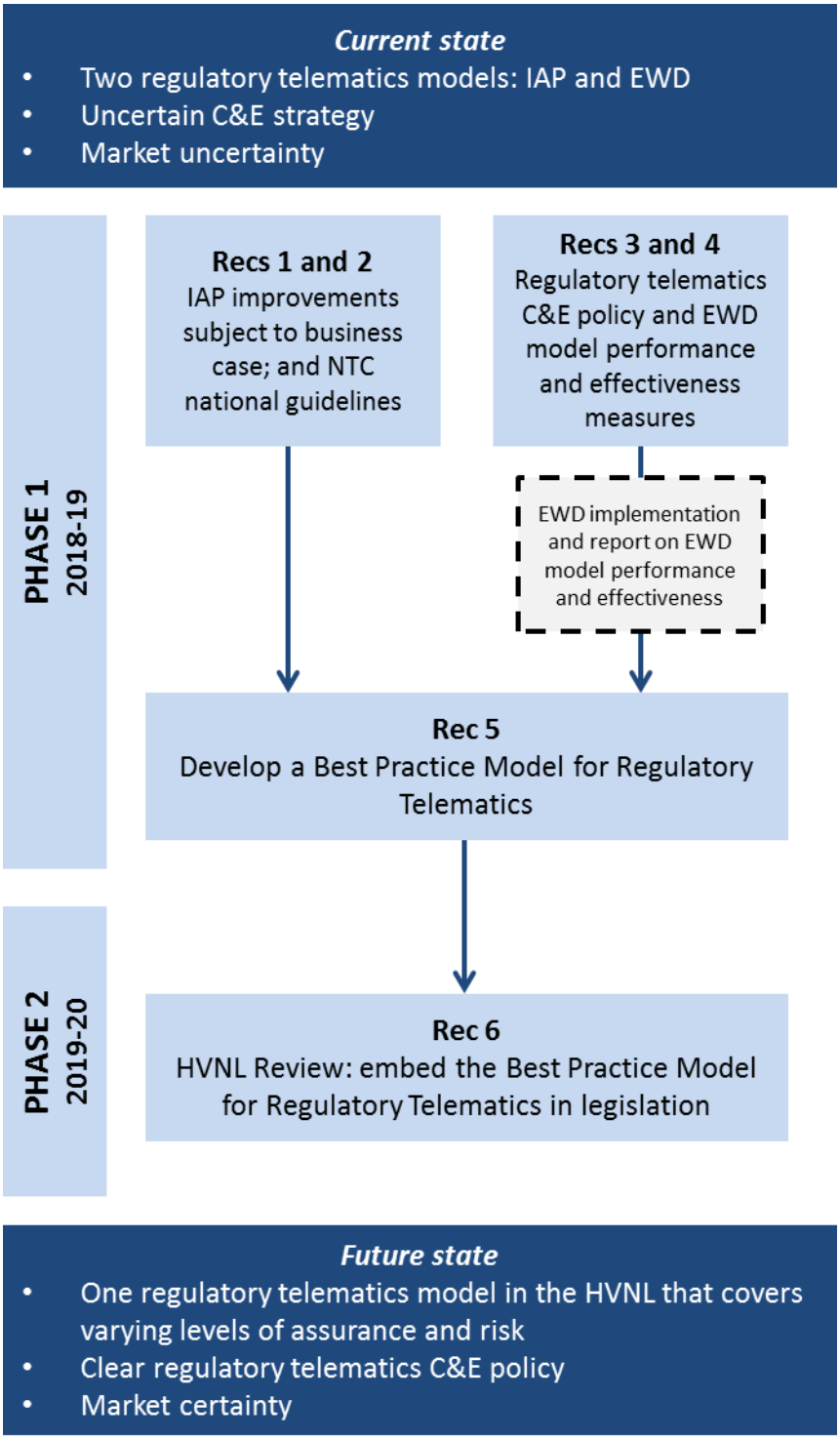
In addition, the NHVR should be directed to clarify how regulatory telematics data will be used as a tool in meeting heavy vehicle compliance and enforcement objectives. The NHVR should also be directed to develop performance and effectiveness measures designed to help assess the success of the EWD model 12 months from the NHVR issuing the first EWD approval.

Building on these measures, work should be undertaken to co-design with industry a regulatory telematics model that moves Australia to a more co-regulatory approach that seeks an appropriate balance between accuracy, cost, innovation and incentives. We recommend that this best practice model is then used as an input to the HVNL review of the current fatigue and IAP provisions. The HVNL review is planned to commence from mid-2019. The model should also be sufficiently broad-based to accommodate other transport applications outside the HVNL.

Such an approach would include the following key initiatives over two phases (Figure 1):

- **Phase 1 – IAP 2018-19:** undertake initiatives to improve the IAP model performance and cost effectiveness. Proposed IAP performance improvements should be subject to a business case and approved implementation plan. To improve IAP cost-effectiveness, develop national guidelines to determine when a new application or vehicle type should be included in IAP. Recommendations 1 and 2.
- **Phase 1 – EWD 2018-19:** develop a regulatory telematics policy that clarifies how regulatory telematics data will be used to meet heavy vehicle compliance and enforcement objectives. Develop EWD model performance and effectiveness measures. Recommendations 3 and 4.
- **Phase 1 – 2018-19:** co-design with the NHVR, road transport agencies, the road transport industry, TCA and technology providers a Best Practice Model for Regulatory Telematics. Building on existing strategies and frameworks, clarify roles and responsibilities of government and industry, establish agreed minimum technical standards and clarify the levels of assurance that may be appropriate under different circumstances. Recommendation 5.
- **Phase 2 – 2019-20:** review chapter 6 (fatigue) and chapter 7 (IAP) of the HVNL with a view to legislate the Best Practice Model for Regulatory Telematics and establish one model for the use of regulatory telematics, subject to public consultation, cost benefit analysis and appraisal of whether the EWD model has provided the NHVR with sufficiently accurate records for regulatory purposes. Recommendation 6.

Figure 1. Proposed two phased reform program



Findings related to the current state of IAP

- **Finding 1:** between 2013 and 2017, enrolment in the IAP has increased from 2,483 to 4,374, which is a growth rate of 76% over a four-year period.
- **Finding 2:** the IAP market is relatively small compared to the size of the road haulage industry. There are 98,108 articulated heavy vehicles registered in Australia and 4,374 vehicles enrolled in the IAP.[1] In addition there are 38,779 telematics units installed in heavy vehicles that are not currently enrolled in IAP that meet, or can meet, the *Telematics In-Vehicle Unit (IVU) Functional and Technical Specification*.
- **Finding 3:** the IAP market is relatively small compared to the size of the telematics industry. There are over 50 service providers in Australia offering regulatory and commercial telematics solutions. There are five service providers offering IAP.
- **Finding 4:** initial and ongoing costs of IAP certification are substantial. Service providers spend between $500,000 and $2 million to certify a system for the IAP and around 27% of an operator's monthly IAP fee goes back to TCA.[2] TCA advised the costs associated with the IAP are commensurate with investments required to provide traditional, certificate-based regulatory systems used by road agencies.
- **Finding 5:** IAP provides road transport agencies with non-conformance reports retrospectively. TCA advised that road transport agencies receive non-conformance reports within no more than 72 hours after the alleged breach of an access condition. Road transport agencies analyse the non-conformance reports around one month after the alleged breach of an access condition. There is a missed opportunity for road transport agencies to proactively manage real-time safety and infrastructure risks.
- **Finding 6:** IAP does not provide network managers with any information about what IAP vehicles, or vehicle combinations, have used the network, or when. The HVNL allows TCA to use or disclose IAP information for research purposes; however road transport agencies believe there is a missed opportunity for aggregated and de-identified IAP data to be leveraged to assess network demand and to support asset investment decisions.
- **Finding 7:** IAP generates many false positives. For example, New South Wales processes 70,000 non-conformance reports a month. Nationally, over 1 million non-conformance reports are dealt with annually – the majority are false positives. There are a range of reasons for the high number of false positives occurring. TCA advised it is due to the method used by road managers and regulators to set the electronic monitoring conditions for vehicles (which may not align with the road access conditions granted), however other factors were identified by road transport agencies, including limitations of mapping and GNSS in the IAP specification.
- **Finding 8:** road transport agencies have only prosecuted crane operators under IAP (New South Wales has had 15 successful prosecutions). IAP certifies vehicle location, but other elements of proving an offence (typically mass and trailer combination) often rely on self-declaration. This may indicate why there have been no IAP prosecutions in relation to vehicle types that have variable mass and vehicle combinations. However, some road transport agencies, such as Queensland, are focused on education and compliance rather than prosecutions.

[1] Not all vehicles registered in IAP are articulated vehicles (e.g. some are PBS vehicles and over-dimensional cranes). However, the comparison provides an overview of the impact of IAP on the road haulage industry.
[2] Based on IAP service provider information, TCA charges $39 per unit per month, and service providers charge IAP clients around $80 to $250 per unit per month.

TCA have reported higher levels of assurance may emerge in the future through the OBM program, which will link location, speed, time, vehicle configuration and mass data through the use of a type-approved OBM System.

Findings related to stakeholder views on IAP

- **Finding 9:** road agency officials who use IAP value the certainty it provides that operators are route-compliant. While IAP does not guarantee location information will always be accurate, TCA provides certificates of evidence that clarify whether IAP was working at a point in time.
- **Finding 10:** IAP uptake is driven by road transport agency policy settings. There are no agreed national principles or policies that determine why some applications are in IAP, and others are not. Variable state policy settings have led to differences in use of IAP applications as a condition of access. For example, IAP is a requirement for HML access in Queensland and parts of New South Wales, but not elsewhere. This is largely due to varying infrastructure standards, but these differences limit the value proposition of IAP for industry.
- **Finding 11:** operators that voluntarily use IAP are positive about the economic benefits and the return of investing in the IAP.
- **Finding 12:** crane operators that must use the IAP to operate on public roads regard IAP as an additional administrative cost that does not provide any operational benefits. The crane industry is supportive of IAP if it facilitates a transition from permits to gazetted notices to manage road access.
- **Finding 13:** transport operators that **do not use** IAP, and peak bodies, believe that IAP is a government-imposed cost with little benefit. There is a perception in industry that IAP is expensive and industry does not have certainty as to what specific applications will be included in IAP in the future.
- **Finding 14:** service providers that have invested in IAP strongly promote the value of certification, and champion the certainty it provides governments and operators that electronic records are accurate and dependable. Conversely, service providers that have not invested in IAP claim that certification inhibits uptake of telematics, is uneconomical and accurate records can be addressed through audit-based self-certification approaches.
- **Finding 15:** certified IAP service providers seek more accurate, reliable and timely IAP mapping and road access condition information. IAP maps are updated quarterly, and some jurisdictions have elected to link the updates to road access conditions at the same time. As such, there is a time lag between road access conditions being represented on IAP maps. There is an opportunity to address this issue through updating road access conditions granted by road managers more frequently (in a separate process from the quarterly road network map update).
- **Finding 16:** there are legislative restrictions on IAP service providers providing non-conformance reports to IAP operators. Without timely and accurate information about when a driver has breached an access condition, operators have limited opportunities to actively manage access condition breaches.

Findings related to the current state of EWDs

- **Finding 17:** organisations that have invested in IAP are critical of the EWD model adopted by the NHVR. They are concerned that an assurance model that allows industry to self-assess conformance with minimum standards will not provide sufficiently accurate and reliable records for prosecutions.

- **Finding 18:** organisations that have not invested in IAP, including heavy vehicle operators, peak bodies and other service providers, largely welcome the NHVR's approach. These organisations broadly expect the NHVR's approach will be balanced, support innovation and be more cost-effective, recognising that the accuracy and reliability of written work diaries is already challenging. The NHVR's approach is expected to drive greater uptake of EWDs, which could have significant safety and efficiency benefits.

Findings related to other regulatory telematics applications

- **Finding 19:** industry supports greater use of regulatory telematics to increase safety, compliance and network outcomes. Many operators recognise that telematics can support a range of applications that feature government access to data, including mass and speed monitoring, fatigue management and road user charging. Governments are seeking to maximise the use of telematics data to underpin risk-based intelligence and compliance activities.
- **Finding 20:** operators and service providers are seeking greater policy certainty from governments, and clearer direction about when certification or other assurance models will be appropriate for regulatory telematics.
- **Finding 21:** operators are reluctant to use regulatory telematics unless it is clear in what circumstances enforcement agencies will access and use telematics data. Clarity over how and when regulatory telematics data will be used as a tool to achieve heavy vehicle compliance and enforcement objectives is essential. A regulatory telematics compliance and enforcement policy should clarify when government enforcement agencies will have access to data at the roadside and/or in back-office investigations. This would significantly increase certainty for the heavy vehicle industry and should help drive uptake.
- **Finding 22:** IAP provides a high level of trust and certainty that is unlikely to be warranted or proportionate for every regulatory application. The EWD model adopted by the NHVR is a potential approach for other applications. The EWD model does not rely on a government agency to certify or regulate service providers. This is expected to drive down costs and support innovation, but it remains to be seen whether this model addresses risks related to the integrity and evidentiary value of EWD records.
- **Finding 23:** governments could collaborate more with industry to co-design an agreed model for regulatory telematics applications. Such a framework could set expectations about how government and industry can reach a balance between supporting innovation and affordability while meeting minimum standards of trust and evidentiary value. Police agencies should also be consulted to ensure that telematics solutions can be accessed efficiently and reliably for roadside enforcement (when relevant).
- **Finding 24:** chain of responsibility laws have not been a key driver for the uptake of regulatory telematics. HVNL amendments in 2018 to introduce a primary safety duty and executive officer liability may address this, but increased and focused enforcement of chain of responsibility obligations would be a significant incentive to invest in regulatory telematics.
- **Finding 25:** some service providers are of the view that government could do more to support regulatory telematics through procurement processes. For example, governments could require IAP on higher risk heavy vehicle operations.

Findings related to stakeholder views on governance

- **Finding 26:** governments contribute a total of $1.9 million to $2.1 million each year to fund TCA's Triple A model (these costs are not exclusively related to the IAP). There are additional resource costs associated with managing non-conformance reports and undertaking compliance and enforcement activities: road transport agencies are employing around 15 FTEs in total to manage the IAP. The upfront and ongoing costs associated with the EWD model are yet to be determined.
- **Finding 27:** current governance arrangements for IAP and TCA are generally working well. There is an opportunity to improve the oversight of TCA by ensuring seniority and consistent attendance of board members.
- **Finding 28:** the HVNL references ministerial guidelines in relation to the approval of EWDs. In the future, EWD policies and standards set by the NHVR would benefit from ministerial guidelines. This would increase accountability and confidence in the NHVR's delivery of EWDs.

Findings related to existing government strategies

- **Finding 29:** the strategic directions and policy principles set out in the *National Policy Framework for Land Transport Technology* (2016) and the *National In-Vehicle Telematics Strategy* (2011) provide a benchmark from which government and industry can develop a Best Practice Model for Regulatory Telematics (see recommendation 5). Many of the threats identified in the 2011 telematics strategy, such as a lack of policy certainty, have partially eventuated.
- **Finding 30:** the *Compliance and Enforcement Framework for Heavy Vehicle Telematics* (2014) provides a data dictionary to support peer-to-peer communication and practical guidance about when government assurance of telematics is appropriate. This could be used more by governments, and could be updated or replaced by the Best Practice Model for Regulatory Telematics (see recommendation 5).

Recommendations

Recommendation 1: That TCA examines the feasibility of improving the IAP in the following areas:

1.1 Reviewing the IAP specification to improve the accuracy of vehicle location, mapping information and alarm records, with the aim of minimising the number of non-conformance reports generated by IAP.

1.2 Providing real-time information to IAP service providers and operators, including underlying navigable data (for example, to support dynamic decision-making when roadworks result in unexpected road closures).

1.3 Improving business processes to manage access and map updates in a timelier manner, and to rationalise IAP certificates.

1.4 Any other areas that would improve the value, efficiency and affordability of IAP for government and industry.

Lead agency: TCA, in collaboration with the NHVR, the road transport industry, technology providers and road transport agencies.

Timeframe: deliver a business case with timeframes to the Council by November 2018.

Recommendation 2: That the NTC develops national guidelines that set out agreed principles and a methodology for road transport agencies to apply when assessing the costs and benefits of including new vehicle types or future applications in the IAP.

Lead agency: the NTC.

Timeframe: submit to Council by November 2018.

Recommendation 3: That the NHVR develops and applies a national compliance and enforcement policy for regulatory telematics. Working closely with road transport agencies, police and the NTC, the enforcement policy should provide regulatory certainty as to how telematics will be used to meet heavy vehicle compliance and enforcement objectives. The national policy will draw on the NTC's *Compliance and Enforcement Framework for Heavy Vehicle Telematics* and consider in what circumstances roadside enforcement can be enhanced or replaced by greater emphasis on compliance and audit.

Lead agency: the NHVR.

Timeframe: submit to Council by November 2018.

Recommendation 4: That the NHVR develops outcome performance and effectiveness measures to assess the success of the EWD model 12 months from first approval and subsequently provide a report under s 659(2)(i) of the HVNL on the extent to which those objectives have been achieved and any proposed performance or governance-related improvements (including for example the making of ministerial guidelines under s 635 for the purpose of s 343(3) of the HVNL).

Lead agency: the NHVR.

Timeframe: the NHVR develops outcome performance and effectiveness measures by the end of 2018 and a report to the Council by late 2019.

Recommendation 5: That, in collaboration with the NHVR, road transport agencies, the road transport industry, TCA and technology providers, the NTC co-designs a Best Practice Model for Regulatory Telematics. The best practice model should provide a technology- and application-neutral model that supports the use of regulatory telematics data to achieve heavy vehicle compliance and enforcement objectives, and in doing so supports the key objectives of Australian transport legislation at minimal cost and with limited government certification and regulation of service providers. Drawing on the implementation of the EWD model, the best practice model should:

- describe the roles and responsibilities of government agencies, police, service providers and heavy vehicle operators
- set expectations as to what regulatory telematics should address, including in relation to:
    - electronic recording devices
    - communications
    - physical and cyber-security
    - back-office systems, and
    - data storage, sharing and destruction.
- update and apply the *Compliance and Enforcement Framework for Heavy Vehicle Telematics'* data dictionary that standardises the terminology and format of data inputs that can be used by industry in minimum standards

- update and apply the *Compliance and Enforcement Framework for Heavy Vehicle Telematics'* evaluation tool that sets out in what circumstances government certification of regulatory telematics is appropriate, and
- identify low-cost options and measurable benefits for industry.

Lead agency: the NTC.

Timeframe: submit to Council by November 2019.

Recommendation 6: That, as part of the review of the HVNL, the NTC, in consultation with the NHVR, road transport agencies, the road transport industry, TCA and technology providers, assesses whether the co-designed Best Practice Model for Regulatory Telematics should be legislated and replace existing regulatory telematics models. The assessment should be subject to public consultation, cost benefit analysis and appraisal of whether the EWD and IAP models are fit for purpose. This should include assessment of whether the EWD model has provided the NHVR with sufficiently accurate records for regulatory purposes.

In addition, the review of the HVNL should explore the provision of real-time non-conformance reports to the relevant operator, and the provision of de-identified aggregated IAP information to road transport agencies for investment, network management and traffic management purposes.

Lead agency: the NTC.

Timeframe: the review of the HVNL is planned to commence in FY 2019–2020.

1 Context

Key points

- The Transport and Infrastructure Senior Officials' Committee (TISOC) has asked the National Transport Commission (NTC) to undertake a review of regulatory telematics.
- The purpose is to review the role of regulatory telematics, to assess the currency of existing strategies, to recommend how telematics can be more widely adopted, and to identify models for adoption.

1.1 Conduct of the review

TISOC has asked the NTC to undertake a review of regulatory telematics. The NTC have prepared this report for consideration by TISOC in March 2018. The review's terms of reference are available at Appendix A.

The review has been undertaken in consultation with the Commonwealth Department of Infrastructure, Regional Development and Cities (DIRDAC), state/territory departments and road transport agencies, the National Heavy Vehicle Regulator (NHVR), Transport Certification Australia (TCA), police, heavy vehicle operators, peak bodies, and service providers (including service providers that are IAP certified, and service providers that are not IAP certified). The review relied on desktop research, information requests and targeted interviews. The NTC conducted a total of 26 interviews.

1.2 Purpose of the review

The purpose of the review was to:

1. Review the role of regulatory telematics, including governance, to support the key objectives of Australian transport legislation, in particular safety, productivity, compliance, environmental outcomes and protection of infrastructure and to support regulatory efficiency.
2. Assess the currency of the existing strategies and whether any amended or additional policy statements should be considered by the Transport and Infrastructure Council (Council), including:
    a. *National Policy Framework for Land Transport Technology* (Council, 2016)
    b. *National In-Vehicle Telematics Strategy* (NTC, 2011)
    c. *Compliance and Enforcement Framework for Heavy Vehicle Telematics* (NTC, 2014).
3. Recommend how widespread use of telematics could be adopted using systems currently available, at minimum cost to operators, to allow regulators to monitor compliance and enforcement in relation to:
    a. Routes
    b. Fatigue
    c. Drug and alcohol
    d. Speed and mass
    e. Driver efficiency
    f. Emissions; and

g. Any other areas as identified by the review suitable for regulatory purposes.

4. Provide models for adoption.

The review also provides a consistent definition of telematics and a chronology of telematics use in Australia for regulatory purposes.

1.3 Scope of the review

In September 2017, TISOC agreed that the NTC 'undertake a review of the regulatory arrangements and governance structures to assess whether the arrangements governing regulatory telematics use remain appropriate.'

The Council approved the *National In-Vehicle Telematics Strategy* in 2011. In addition, the Council approved the *National Policy Framework for Land Transport Technology* in 2016.

There are currently two regulatory telematics applications that are part of the Heavy Vehicle National Law (HVNL):

1. the Intelligent Access Program (IAP) that has been in operation since 2009, and
2. the Electronic Work Diary (EWD) administered by the NHVR.

In-vehicle telematics are also being used by individual jurisdictions for other regulatory purposes, e.g. monitoring of taxis, buses and the use of alcohol interlock devices. With the increased use of telematics for commercial purposes it is timely to consider the use of telematics more holistically and consider what arrangements will best support their use for regulatory purposes.

1.4 Methodology

The NTC has undertaken: desktop research, targeted stakeholder interviews and information requests to road transport agencies and TCA.

The NTC carried out a number of desktop research tasks in the preliminary stages of the review including researching current and emerging telematics applications, investigating the regulatory telematics policy and legislative environment and reviewing relevant annual reports, frameworks and strategies.

Based on the findings from the desktop research, the NTC developed a set of targeted interview questions for stakeholders. Between 17 November 2017 and 22 January 2018, the NTC conducted a total of 26 interviews with the Commonwealth, road transport agencies, the NHVR, TCA, police, operators, peak bodies, and service providers (including service providers that are IAP certified, and service providers that are not IAP certified) (Appendix B). The interviews comprised approximately 15 to 30 questions relating to opportunities, challenges and solutions for regulatory telematics (Appendix C).

The NTC sent formal information requests to road transport agencies and TCA asking for information relating to the uptake of regulatory telematics, and financial contributions made to TCA.

The NTC has relied on the data and views of stakeholders and desktop research to inform the findings and analysis of the review.

1.5 Background

1.5.1 Regulatory telematics definition

Telematics are a type of technology which involves a system that captures and sends information electronically, typically with an in-vehicle device. Depending on the application, telematics can be used for regulatory purposes, such as recording work and

rest hours, and attributes such as speed, location, and on board mass. Telematics also have commercial uses, allowing organisations to optimise the efficiency of private commercial freight operations by collecting diagnostics about harsh braking, engine performance and routing, or to monitor drivers and the driving task.

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 with applications that will:[3]

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

1.5.2 Regulatory telematics chronology

Over the past 15 years, telematics has developed from stand-alone single-use devices to interactive, intelligent and event-driven systems (Appendix E). During this time telematics have developed as an effective regulatory tool to complement more traditional heavy vehicle compliance and enforcement practices.

For example, in the early 2000s, the EWD was expected to be a stand-alone unit that required the heavy vehicle to have an on-board printer. Since then, the EWD device has progressed with plans to integrate into an operator's fatigue management system to electronically record hours of work and rest, using one in-vehicle unit to collect location and vehicle data for multiple purposes.

The market is also adapting to the development of tablet and smartphone technologies, whereby a single platform may have multiple applications and be accessed on a range of devices.

1.5.3 Regulatory telematics policy environment

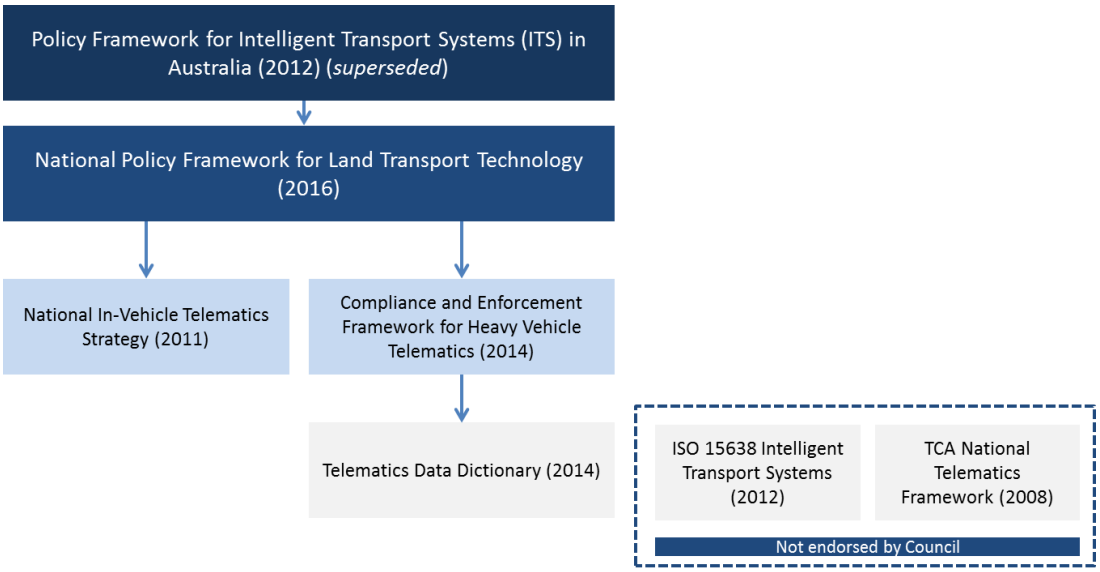
There are several government-approved policies that relate to telematics used for regulatory purposes (Figure 2). These include:

1. The *National In-Vehicle Telematics Strategy* (2011 strategy). The *2011 strategy* was approved by the Council in 2011 and identifies opportunities for regulatory telematics. The *2011 strategy* provides that governments can address supply chain market failures and enable regulatory policies by encouraging the uptake of telematics. The *2011 strategy* identifies when governments should partner with businesses to improve telematics use, and when the mandatory use of telematics may be warranted.
2. The *Compliance and Enforcement Framework for Heavy Vehicle Telematics* (C&E Framework). The *C&E Framework* was approved by the Council in 2014. The goal of the *C&E Framework* is to encourage the widespread use of in-vehicle telematics, supported by responsive management and reporting systems. The *C&E Framework* states that the level of government oversight of a telematics device will depend on a number of factors, including whether the telematics information is to be used for roadside enforcement or to support audit-based compliance activities.

[3] National Transport Commission, 2011, *National in-vehicle telematics strategy: the road freight sector,* Policy Paper, p. 1, https://www.ntc.gov.au/Media/Reports/(5CD00DF0-8418-8BBA-DC53-63774FAA0E85).pdf.

3. The *National Policy Framework for Land Transport Technology* (National Policy Framework). The *National Policy Framework* was approved by the Council in 2016 and underpins the role of government in relation to regulatory telematics and includes seven policy principles to inform a consistent approach to enabling new technologies.

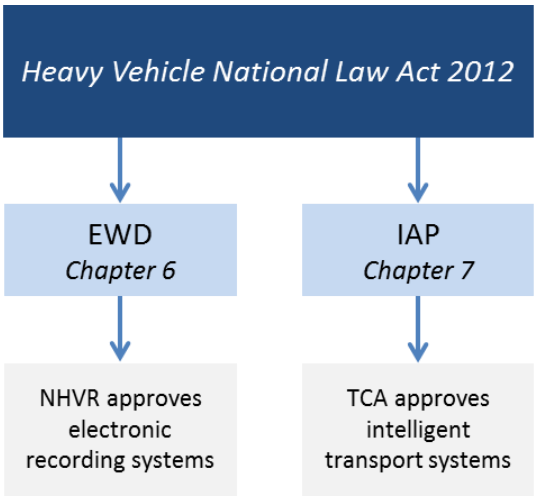
Figure 2. Regulatory telematics policy environment



1.5.4 Regulatory telematics legislative environment

There are two initiatives in the HVNL that utilise telematics for regulatory purposes in the heavy vehicle transport sector: the IAP, and the EWD. EWDs are currently approved by the NHVR[4] and the intelligent transport systems for the purposes of the IAP are approved by TCA[5] (Figure 3).

Figure 3. EWDs and the IAP legislative environment



[4] *Heavy Vehicle National Law Act 2012*, Chapter 6 Vehicle Operations Driver Fatigue.
[5] *Heavy Vehicle National Law Act 2012*, Chapter 7 Intelligence Access Program.

2 Current state

Key points

- There are 98,108 articulated trucks registered in Australia and 4,374 vehicles enrolled in the IAP.
- There are over 50 service providers in the Australian market offering regulatory and commercial telematics solutions. There are five service providers offering IAP.
- There are 38,779 telematics units installed in heavy vehicles across the country that meet, or can meet, the *Telematics In-Vehicle Unit (IVU) Functional and Technical Specification*.
- Regulatory telematics are being used in taxis and rideshare vehicles, buses, on-board mass, alcohol interlocks, road user charging and the insurance and waste sector.
- Survey data between 2012 and 2017 indicates operators use telematics to track vehicles and to monitor speed, distance, fatigue and vehicle maintenance. However, basic vehicle location information is the most common use of telematics in the road transport sector.

The following section of the review will explain current telematics applications used for regulatory purposes, including:

- regulatory telematics
- the IAP
- taxis and rideshare vehicles
- buses
- on board mass
- alcohol interlocks
- road user charging
- waste sector, and
- insurance sector.

2.1 Regulatory telematics

In July 2017, there were 98,108 articulated trucks registered in Australia.[6] In November 2017, there were 4,374 vehicles enrolled in the IAP, representing around 4.5% of the heavy vehicle sector.[7] Between 2013 and 2017 enrolment in the IAP has increased from 2,483 to 4,374, illustrating a growth rate of 76% over a four-year period.

There are over 50 service providers in the Australian market offering regulatory and commercial telematics solutions, including applications for fatigue, speed, interim On Board Mass (OBM), fleet management, alcohol interlocks, fuel tax credits and management of in house operations. There are five service providers offering IAP.

[6] Australian Bureau of Statistics, 2017, *Motor Vehicle Census Australia 31 Jan 2017,* http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/9309.031%20Jan%202017?OpenDocument.
[7] As IAP enrolment is dependent on policies and road access conditions set by road managers and regulators. As such, the IAP enrolment figure is not expected to represent the entire heavy vehicle sector.

Table 1 shows vehicle numbers enrolled in the IAP and Certified Telematics Service (CTS). Vehicles enrolled in the Intelligent Speed Compliance (ISC) and OBM System are a subset of IAP.

Table 1. Number of vehicles enrolled in the IAP, ISC, OBM and CTS in 2017[8]

Specific application type	NSW	QLD	SA	TAS	VIC	WA
Intelligent Access Program (IAP)	2883	1951	44	0	397	154
Intelligent Speed Compliance (ISC)	0	0	0	0	0	76[9]
On Board Mass (OBM) System	79	270	0	0	0	0
Certified Telematics Service (CTS)	0	0	0	187	0	0
Road Pricing App	0	0	0	0	0	40

Table 2 shows the vehicle uptake by the states that have implemented the IAP by application type. The table compares the numbers of vehicles enrolled in the IAP in 2013[10] and 2017. Vehicles can be monitored against multiple access conditions across multiple jurisdictions. More than 800 vehicles are monitored in more than one jurisdiction. Consequently, the sum of the number of monitored vehicles is greater than the total number of unique vehicles enrolled.

Table 2. Vehicle uptake by specific IAP application type in 2013 and 2017[11]

Specific application type	NSW		VIC		QLD		SA		TAS		WA		TOTAL	
	2013	*2017*	*2013*	*2017*	*2013*	*2017*	*2013*	*2017*	*2013*	*2017*	*2013*	*2017*	*2013*	*2017*
Over-dimensional and over-mass cranes	483	609	227	181	247	270	0	0	0	0	0	0	**957**	**1060**
Performance-based standards and higher mass limits	931	2428	15	202	609	1681	49	71	0	0	0	148	**1604**	**4530**
Other	39	316	0	14	106	0	0	0	198	187	0	6	**343**	**523**
Total	**1453**	**3353**	**242**	**397**	**962**	**1951**	**49**	**71**	**198**	**187**	**0**	**154**	**2904**	**6113**

In November 2017, TCA reported there were 38,779 telematics units installed in heavy vehicles across the country that meet, or can meet, the *Telematics In-Vehicle Unit (IVU)*

[8] Vehicles can be monitored against multiple access conditions across multiple jurisdictions. More than 800 vehicles are monitored in more than one jurisdiction. Consequently, the sum of the number of monitored vehicles is greater than the total number of unique vehicles enrolled.
[9] This figure is a subset of IAP.
[10] National Transport Commission, 2014, *Review of the Intelligent Access Program*, Consultation Paper, p. 18, https://www.ntc.gov.au/Media/Reports/(969A07AB-745D-49C7-9DB2-2D5249230978).pdf.
[11] Data related to South Australia and Tasmania provided by TCA. All other data provided by each jurisdiction.

Functional and Technical Specification.[12] TCA further reported that there are 66 devices approved by 'type' that are currently being used in the market (including user interfaces, smartphones, and advanced telematics devices which support multiple apps).[13]

In 2017, Teletrac Navman conducted a survey with 1,200 fleet operators from around the world, including 107 operators located in Australia.[14] Survey responses indicated that 72% of the transport businesses in the survey are using telematics across all vehicles/assets, 9% are using telematics when provided by the vehicle manufacturer, 7% plan to use telematics within the next year and 12% have no immediate plans to use telematics.[15] Among respondents who use telematics or plan to introduce it in their operations, 82% use telematics to monitor vehicle tracking, 74% to monitor speed, 57% to monitor distance driven and driver fatigue and 54% to monitor maintenance.[16]

In 2014, ACA Research conducted a study with 205 Australian road freight transport companies that revealed 35% of these operators were using telematics.[17] Of those operators using telematics, 92% were using telematics for vehicle tracking features.[18] Features associated with compliance, such as monitoring fatigue, were less commonly used (39%). The study found that the most common reason operators were not using telematics was due to the fleet size, with smaller operators believing the cost of the equipment outweighed the benefits relative to their fleet size.[19]

In 2012, the NTC conducted two surveys with 400 freight operators and 500 heavy vehicle drivers: *Survey on Compliance, Enforcement and Speed* and *Survey on Driver Fatigue*.

The *Survey on Compliance, Enforcement and Speed* asked companies and drivers about the operational and compliance practices their company had in place, including the use of 'monitoring' and 'electronic monitoring' of driver behaviour. The study found that 79% of drivers and 42% of operators had monitoring and preventative practices in place that used technology.[20] These forms of technology included GPS tracking to monitor speed (used by 54% of companies), use of speed limiters (used by 21% of companies) and other type of computer device in-vehicle (used by 17% of companies).[21]

The *Survey on Driver Fatigue* asked drivers and operators about the ways in which they monitored fatigue. The study found that 44% of companies and 53% of drivers used electronic monitoring systems to monitor fatigue.[22] Of those who used electronic monitoring systems, 92% of companies used satellite tracking or GPS.[23] Electronic work diaries (20%) and lane monitoring devices (27%) were also used, as well as other devices/software (24%) including the IAP and on-board driver communication systems.[24] The study concluded that larger companies were more likely than smaller operators to have practices in place, including monitoring the levels of fatigue, and using an electronic monitoring device.[25]

---

[12] Transport Certification Australia, 2017, *TCA Quarterly Briefing: November 2017*, p. 10.
[13] ibid.
[14] Teletrac Navman, 2017, *Telematics Benchmark Report Australian Transportation Edition,* p. 18, https://marketing.teletracnavman.com/marketing/assets/industry%20insights/au/2017transportbenchmarkreport_au_final.pdf
[15] ibid., p. 11.
[16] ibid., p. 12.
[17] ACA Research, 2014, *New Automotive Research: The Use of Telematics in Road Freight Transport Companies,* http://www.acaresearch.com.au/australian-market-research-blog/bid/333093/New-Automotive-Research-The-Use-of-Telematics-in-Road-Freight-Transport-Companies.
[18] ibid.
[19] ibid.
[20] National Transport Commission, 2012, *Reform Evaluation in the Road Transport Industry, 2012: Survey on Compliance, Enforcement and Speed,* p. 39, https://www.ntc.gov.au/Media/Reports/(2B3C0C37-2A76-4811-C815-02A229BDD24D).pdf.
[21] ibid., p. 41.
[22] National Transport Commission, 2012, *Reform Evaluation in the Road Transport Industry, 2012: Survey on Driver Fatigue,* p. 26, https://www.ntc.gov.au/Media/Reports/(7A1EF335-ACF2-6F1A-7445-6F72466013D9).pdf.
[23] ibid., p. 27.
[24] ibid.
[25] ibid., p. 25.

The Department of Transport and Main Roads Queensland have developed a Heavy Vehicle Telematics Strategy in collaboration with industry and government stakeholders.[26] The strategy sets the direction for connecting heavy vehicles using satellite tracking and wireless communications to the state's road network, and obtaining essential data to help manage road infrastructure risk, facilitate access and better understand network use.[27] The strategy includes four key pillars: innovation, partnerships, policy and governance and compliance and sets short, medium and long term goals to promote the uptake of telematics.[28] Some of the key goals of the strategy include: encourage and expand the use of telematics, mandate the IAP on heavy mobile cranes to realise productivity gains and cost savings, increase the number of IAP/OBM schemes linked to higher productivity and high risk vehicles to achieve efficiencies and explore potential OBM monitoring on heavy mobile cranes.[29]

Opportunities for data-led regulatory approaches

Telematics can be used as a tool to increase compliance across a range of regulatory areas. Underpinning telematics is data that can be used by both government and industry to improve compliance and enforcement outcomes.

In 2017, the International Transport Forum (ITF) advised there appears to be an increasing gap between regulatory frameworks in road freight transport and underlying policy objectives.[30] The ITF warned this can lead to undesired outcomes and challenges for enforcement authorities.[31] The ITF explained there is potential for data-driven approaches to bridge the gap with more targeted and flexible regulatory frameworks and more efficient enforcement mechanisms.[32] However, a number of specific challenges still need to be overcome for wide-spread implementation of data-driven regulation and enforcement.

The ITF stated there is potential for new technologies, newly available data and the combination of the two to either improve the enforcement of current regulatory frameworks or even replace these by a data-driven approach.[33] The ITF argued a shift to data-driven policy and regulation holds the promise of offering policy makers and regulators a superior tool for detecting non-compliance and ensuring that policy objectives are met.[34]

In addition, the ITF cited benefits to the road freight industry to include: enabling more efficient transport solutions based on platforms matching supply and demand, creating more flexible conditions for drivers through reduced driving tasks and increasing vehicle automation.[35]

The ITF outlined that in order to move towards data-led regulatory approaches, a number of factors must be considered, including:[36]

- the development of guidelines to address data-related issues such as ownership, privacy and security
- consideration of the cost implications for road freight transport industry, infrastructure managers and enforcement bodies, and

[26] Department of Transport and Main Roads, 2016, *Transport and Main Roads Heavy Vehicle Telematics Strategy 2016,* https://www.tmr.qld.gov.au/-/media/busind/Heavyvehicles/trb-heavy-vehicle-telematics-strategy-2016.pdf?la=en.
[27] ibid.
[28] ibid., p. 2.
[29] ibid.
[30] International Transport Forum, 2017, *Data-led Governance of Road Freight Transport*, p. 6, https://www.itf-oecd.org/sites/default/files/docs/data-led-governance-road-freight-transport.pdf.
[31] ibid., p. 29.
[32] ibid., p. 6.
[33] ibid., p. 12.
[34] ibid., p. 11.
[35] ibid., p. 11.
[36] ibid., p. 24, p. 26, p. 23.

- adequate stakeholder engagement in the conception and development phases.

Findings

- Between 2013 and 2017, enrolment in the IAP has increased from 2,483 to 4,374, which is a growth rate of 76% over a four-year period.
- The IAP market is relatively small compared to the size of the road haulage industry. There are 98,108 articulated heavy vehicles registered in Australia and 4,374 vehicles enrolled in the IAP. In addition there are 38,779 telematics units installed in heavy vehicles that are not currently enrolled in IAP that meet, or can meet, the *Telematics In-Vehicle Unit (IVU) Functional and Technical Specification*.
- The IAP market is relatively small compared to the size of the telematics industry. There are over 50 service providers in Australia offering regulatory and commercial telematics solutions. There are five service providers offering IAP.

2.2 Intelligent Access Program

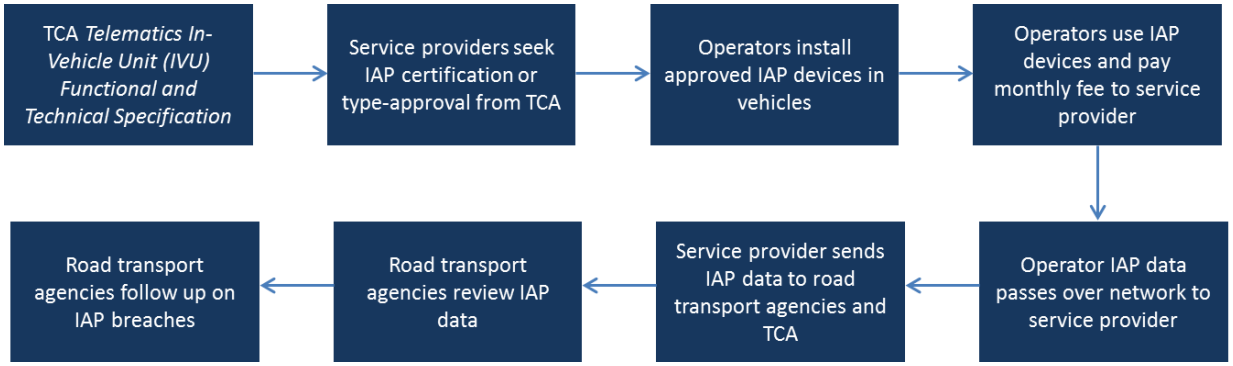
TCA's telematics programs are built on a platform, which TCA refers to as the *National Telematics Framework*. The *National Telematics Framework* houses a growing number of regulatory telematics applications, which cut across a range of policy areas, legislative frameworks and industry sectors, the IAP access application is one example.

The IAP access application is an access and compliance management tool which uses Global Navigation Satellite Systems (GNSS) to monitor heavy vehicles and assure road authorities that enrolled vehicles are complying with agreed conditions. The IAP is an application of the HVNL, and can be used as a condition of access for certain vehicle types to monitor location, mass, speed and time of day. Enrolment in the IAP is currently a road condition for some Higher Mass Limits (HML), Performance-Based Standards (PBS) vehicles and oversize and overmass mobile cranes and concrete pump vehicles.

The operating model of the IAP involves TCA managing the certification, type-approval and auditing of service providers under the *Telematics In-Vehicle Unit (IVU) Functional and Technical Specification*, operators installing and using approved IAP devices, service providers undertaking monitoring of IAP data, and road transport agencies receiving non-conformance reports and following up on detected breaches (Figure 4). Road transport agencies do not have access to the IAP databases or undertake roadside activities to enforce the IAP. TCA can provide an evidentiary certificate that a vehicle was being monitored by a service provider using a certified system. TCA can confirm that the IAP system was or was not operating accurately at a specified point in time.

TCA's IAP model under the *National Telematics Framework* and *Telematics In-Vehicle Unit (IVU) Functional and Technical Specification* provides some degree of certainty and assurance to operators and road managers that the certified device meets a specified standard and can produce reliable evidence. In addition to the initial certification process, the IAP model provides increased assurance through auditing and annual inspection processes, as set out in the *Telematics In-Vehicle Unit (IVU) Functional and Technical Specification.* The IAP model is reflected in TCA's *National Telematics Framework*.

Figure 4. IAP operating model



Section 418 of the HVNL sets out the powers of service providers to use and disclose intelligent access information. The HVNL allows the service provider to disclose intelligent access information about an operator[37], however they cannot disclose information to the operator relating to:[38]

- a non-conformance report about an intelligent access vehicle operated by the operator
- information that a non-conformance report has been made about an intelligent access vehicle operated by the operator, or
- information disclosed under the authority of a warrant.

2.2.1 Background

In 2004, the Commonwealth, States and Territories established TCA to administer the IAP Operating Model.

In 2008, the then Australian Transport Council (ATC) recognised the IAP as a 'preferred compliance and vehicle management solution and that jurisdictions consider a positive approach to timetabling IAP applications where it could assist improving safety, transport services and asset management with respect to heavy vehicle operations, including bus services'.[39] The ATC also noted that the jurisdictions established the IAP as a compliance tool to provide greater compliance assurance in relation to the road freight sector for use as appropriate.[40]

In 2008, TCA published the *National Telematics Framework* to reflect the principles contained in the approved IAP operating model. The *National Telematics Framework* is a platform to support the current and emerging needs of government, industry sectors and end-users, and supports the principles of the *Policy Framework for Intelligent Transport Systems in Australia*.[41] The *National Telematics Framework* conceptually applies some of the IAP principles to other potential platforms and applications, such as Intelligent Speed Compliance and monitoring bus, mining and waste services.[42]

In 2009, the IAP became formally operational and available to transport companies to enrol their vehicles in the IAP and obtain improved access to the road network.

In 2012, TCA contributed to the ISO 15638 *Intelligent transport systems – Framework for cooperative telematics applications for regulated commercial freight vehicles (TARV) – Part 1: Framework and architecture* through the International Organization for

[37] *Heavy Vehicle National Law 2012* (QLD), section 418(5).
[38] ibid., section 418(6).
[39] Australian Transport Council (ATC) Minutes – May 2008.
[40] ibid.
[41] Transport Certification Australia, 2017, *National Telematics Framework*, https://tca.gov.au/ntf/national-telematics-framework.
[42] ibid., p. 5.

Standardization (ISO). The TARV is consistent with the principles in the *National Telematics Framework*.

2.2.2 IAP objectives

Under the HVNL and state and territory transport legislation,[43] regulatory telematics support the achievement of safety, productivity, compliance, environmental and protection of infrastructure objectives.

The IAP is able to remotely manage the potential risk of infrastructure being exposed to heavy vehicles, plant and equipment, such as bridges and other sensitive structures. The IAP supports the achievement of protection of infrastructure outcomes through:

- road transport agencies negotiating access conditions with operators
- service providers monitoring access and compliance of agreed conditions for sensitive infrastructure, and
- providing insights to road transport agencies on high usage areas to proactively plan for network infrastructure upgrades.

In addition to the above, the IAP supports the achievement of safety, productivity, compliance and environmental outcomes through:

- road transport agencies permitting operators to access roads in exchange for information on speeding and route management
- increasing understanding of how, when and where vehicles are being used and allowing operators to plan for future opportunities, and
- providing operators with the ability to undertake the same freight task with significantly fewer journeys and emissions per tonne kilometre.

2.3 Taxi and rideshare vehicles

Taxi fleets have embraced telematics for regulatory and commercial purposes, including tracking, protecting and optimising vehicles, along with monitoring drivers, assisting with the payment of fares and satellite dispatch of bookings. While telematics may be used for commercial purposes in most jurisdictions, only Victoria and New South Wales are using telematics in taxi fleets for regulatory purposes.

On 26 June 2017, the *Transport (Buses, Taxi-Cabs and Other Commercial Passenger Vehicles) (Taxi-Cab Industry Accreditation and Other Matters) Regulations 2017* (Vic) (Victorian Regulation) came into effect. The Victorian Regulation prescribes that a taxi must not operate unless it is fitted with a functioning global positioning system (GPS) that meets the *Telematics In-Vehicle Unit (IVU) Functional and Technical Specification*.[44] The Victorian Regulation defines the *Telematics In-Vehicle Unit (IVU) Functional and Technical Specification* as: 'the Telematics In-Vehicle Unit (IVU) Functional and Technical Specification, published by Transport Certification Australia in May 2014 as in force from time to time.'[45] The Victorian Regulation uses TCA's *Telematics In-Vehicle Unit (IVU) Functional and Technical Specification* for regulatory purposes to measure compliance of GNSS units.

In addition to GNSS, TCA has reported it has worked with the Taxi Services Commission of Victoria to develop a new Functional and Technical Specification for Fare Devices. At

[43] Legislation including the *Road Transport Act 2013* (NSW), *Transport Integration Act 2010* (Vic) and *Transport Operations (Road Use Management) Act 1995* (Qld).
[44] *Transport (Buses, Taxi-Cabs and Other Commercial Passenger Vehicles) (Taxi-Cab Industry Accreditation and Other Matters) Regulations 2017* (Vic), regulation 56.
[45] ibid., regulation 42.

this time it has not been formally progressed, but has resulted in fare device providers supplying new generation taximeters/fare devices which meet the Specification.[46]

In 2016, the NSW Government announced that it would be introducing a new pricing system for taxis and rideshare services for Compulsory Third Party (CTP) insurance.[47] In December 2017 the CTP reform package commenced under the *Motor Accident Injuries Act 2017* and established a new premium-setting process for green slips for taxis and rideshare vehicles, comprising of a base premium with a top-up or refund based on vehicle usage, collected through in-vehicle technologies such as telematics.[48] Telematics data can record how often a driver is on the road, at what time of the day and how safely they drive, and can enable the NSW Government to price green slip premiums accordingly.[49]

2.4 Buses

Although the IAP applies to heavy vehicles, the IAP is not currently a condition that applies to buses. However, TCA reports that in Tasmania there is a monitoring system based on the IAP that manages school bus contracts, fees and distances travelled.[50] The Tasmanian Department of State Growth operates a Certified Telematics Service to manage school buses and their contract compliance.[51] An In-Vehicle Unit, approved by TCA, is installed in each bus to monitor the school route from origin to destination. This allows the Department to monitor the operation of buses against agreed routes, timetables and contractual obligations. TCA reports that the program has improved data collection for fare-paying school bus contracts throughout Tasmania.[52]

2.5 On Board Mass

OBM has not yet been broadly adopted as a condition of access for regulatory telematics. OBM Systems are able to measure the axle groups and calculate the gross vehicle mass of a vehicle. Transport operators have adopted OBM Systems as a technology-based strategy to better manage commercial obligations, mass compliance and chain of responsibility requirements.[53] TCA has developed an OBM Systems Functional and Technical Specification for service providers and transport operators and will link location, speed, time, vehicle configuration and mass data through a single service.[54] As the Specification forms part of the *National Telematics Framework*, there will be technical, functional, legal and commercial interoperability between the OBM Program and all other programs. TCA has reported that 290 vehicles are being monitored for OBM, indicating a 53% increase in uptake since June 2016.[55]

TCA is currently processing five applications for type-approval of OBM Systems.[56] These applications will progress at different stages, with the first applicant approved during the

---

[46] Transport Certification Australia, 2016, *Next Generation Taximeters*, https://tca.gov.au/taxis/taxi-meters; Transport Certification Australia, 2015, *Functional and Technical Specification for Fare Devices*, http://taxi.vic.gov.au/__data/assets/pdf_file/0016/24235/Fare-Device-Functional-and-Technical-Specification.pdf.
[47] NSW Government, State Insurance Regulatory Authority, 2016, *Review of CTP Green Slip insurance for point-to-point transport vehicles*, https://www.sira.nsw.gov.au/consultations/review-of-ctp-motor-vehicle-insurance-point-to-point-transport-vehicles.
[48] ibid, division 2.3 of the Act.
[49] Finance, Services & Innovation, 2016, *Green Slip Overhaul To Benefit Point-to-Point Vehicles*, https://www.finance.nsw.gov.au/about-us/media-releases/green-slip-overhaul-benefit-point-point-vehicles.
[50] Transport Certification Australia, 2017, *School Bus Contracts in Tasmania,* https://tca.gov.au/buses/contract-management.
[51] ibid.
[52] ibid.
[53] Transport Certification Australia, 2017, *On-Board Mass (OBM) Systems*, https://tca.gov.au/truck/obms-ta.
[54] Transport Certification Australia, 2017, *OBM System Functional and Technical Specification*, https://tca.gov.au/ntf/specifications/obm-spec.
[55] Transport Certification Australia, 2017, *Annual Report 2016-17,* p. 11, http://tca.gov.au/documents/2016-17_TCA_Annual-Report.pdf.
[56] Transport Certification Australia, 2017, *TCA Quarterly Briefing: November 2017.*

second quarter of 2018. TCA reports that the number of applications paves the way for establishing an open technology market for the supply of OBM systems and ensures that end-users will be provided with more choice, competitive pricing and innovative technology.[57]

2.6 Alcohol interlock devices

An alcohol interlock is an electronic breath testing device that prevents a vehicle from starting if it detects alcohol in the driver's breath sample. It requires a driver (or rider) to provide a sample of breath before the vehicle can start and at random times while the vehicle is running. The driver's blood alcohol concentration (BAC) must be lower than a pre-set threshold of the interlock. If sufficient alcohol is detected in the breath sample, the interlock prevents the vehicle from being started for a period of time. To capture any attempts at circumventing the device the interlock must be capable of taking photographs to identify the person who has provided the breath sample. The interlock device is usually court-imposed and records the compliance history of the driver for a specified period of time and is provided to the road authority.

Legislation and policy in each jurisdiction sets out the requirements for the program, including: the offences that trigger an alcohol interlock program, the amount of time a driver must participate in the program and the accredited alcohol interlock providers (Appendix F). The approach and conditions applied by jurisdictions differ greatly, but strong government oversight of alcohol interlock service providers is consistent across states and territories. This reflects the court-imposed nature of alcohol interlocks.

The NTC has only been able to locate one example of an interlock device being successfully challenged in court. In 2016, a magistrate in Tasmania dismissed charges against an accused drink driver, as it was found that the interlock device in his vehicle allowed him to drive with alcohol in his system.[58] The defendant was using an interlock device and was caught with a BAC of 0.03. During the hearing, evidence was provided by the interlock manufacturer that there was a 'tolerance' inbuilt into the system which may permit a person to drive with alcohol in their system.[59] The Magistrate accepted the defendant's evidence that the interlock should have prevented him from driving with any alcohol in his system.

2.7 Road user charging

Telematics is not currently used in Australia to charge road users for use of the network. However, telematics has underpinned road user charging in New Zealand and Oregon, United States.

New Zealand

New Zealand introduced road user charging in 1978 to charge users based on their impact to the road network. Road user charging applies to diesel powered vehicles and all vehicles (including trailers) with a gross laden weight of 3.5 tonnes or greater. The road user charging system operates under the *Road User Charges Act 2012* (NZ) and the *Road User Charges Regulations 2012* (NZ).

In 2010, EROAD introduced the first autonomous cellular electronic road user charging (eRUC) system as an alternative method to collect road user charging data. Although it is not mandatory to use an electronic system in New Zealand, in 2017 more than 50% of all road user charges from heavy vehicles were collected electronically.

[57] ibid.
[58] ABC News, 2016, *P-plater's drink-driving charge dismissed after manufacturer reveals 'tolerance' in alcohol lock,* http://www.abc.net.au/news/2016-11-24/alcohol-lock-effectiveness-under-review-in-tasmania/8056150.
[59] ibid.

The New Zealand Transport Agency has developed a code of practice to provide a single source of guidance for the performance and implementation of eRUC systems.[60] The code of practice is intended to encourage innovation and technological progress, while setting out legal and other requirements relating to business process and security.[61] The code of practice is made up of three parts which set out the process for approval, functional requirements and outcome-based performance requirements and the terms and conditions that accompany approval of electronic devices. The code of practice assigns clear roles and responsibilities to the Ministry of Transport, the transport agency, the New Zealand police, electronic system providers and vehicle operators.[62] In order for service providers to provide electronic distance devices to customers and authorise electronic licences they must become an agent of the transport agency and gain approval for their devices.[63] The *Road User Charges Act 2012* (NZ) requires the device to be fit for purpose, meaning the device is accurate, robust and secure, tamper resistant, tamper evident and reliable, before approval will be granted. The transport agency and police perform a number of independent tests to determine whether the device is fit for purpose, including reviewing the security plans, protocols and restrictions of the device.

United States, Oregon

Oregon has used a weight mileage tax for commercial heavy vehicles since 1933. Oregon is one of four states in the US that uses distance-based charging for commercial heavy vehicles. Oregon's weight-mile tax regulations allow motor carriers to use electronic systems to meet record keeping requirements as long as they provide all of the required elements included in the administrative rules, and tax rules are complete and accurate.

In 2012, EROAD with the support of the Oregon Department of Transportation and the Oregon Trucking Association, implemented the first GPS cellular based electronic weight-mile tax solution in North America.[64] The solution generates weight-mile tax records, calculates taxes owed and could eventually allow online payments by operators. The solution was based on the technology platform EROAD had implemented to modernise the New Zealand weight-mile tax system. An audit of the system was completed by the Oregon Department of Transportation which found that the system accurately and reliably captures and calculates Oregon weight-mile tax information from commercial motor carriers.[65] The audit also found that the system-generated reports contained all required data elements to meet record keeping requirements and applied correct weight-mile tax rates.[66]

2.8 Waste sector

The waste sector is an emerging market for regulatory telematics.

TCA recently reported that the waste sector would benefit from using in-vehicle telematics, and may already be fitted with type-approved telematics hardware.[67] In-vehicle telematics can be used in the waste industry to monitor and report data such as: vehicle and bin lift location, missed and skipped bins, speed monitoring, journey time,

[60] New Zealand Transport Agency, 2014, *Code of practice for electronic road user charges management systems,* https://www.nzta.govt.nz/assets/resources/road-user-charges/eruc-guidelines/docs/ERUC-code-of-practice.pdf.
[61] ibid., p. 11.
[62] ibid., p. 4.
[63] *Road User Charges Act 2012* (NZ), section 43.
[64] EROAD and State of Oregon Department of Transportation, 2015, *Oregon Electronic Weight-Mile Tax Implementation,* http://www.eroadglobal.com/assets/Uploads/Global/Reports-and-whitepapers/ODOT-EROAD-ElectronicWMTCaseStudy-2015-Web.pdf.
[65] ibid., p. 13.
[66] ibid.
[67] Waste Management Review, 2017, *Telematics and transport: Transport Certification Australia,* http://wastemanagementreview.com.au/tca/.

distance travelled and harsh driving. There are a number of service providers offering to provide in-vehicle telematics to the waste sector.

An example of the waste sector leveraging opportunities provided by telematics involves Cleanaway. Cleanaway have developed 'Cleanaview', an integrated technology solution that provides local councils, customer service staff and management with visibility of vehicle data.[68] Cleanaview provides near real-time information and visibility of truck locations to help local councils answer queries from residents and provide customers with meaningful information to assist in managing and disposing of waste correctly.

2.9 Insurance sector

Insurance companies have adopted telematics for commercial purposes, driven by the private sector, not government, including usage-based insurance, such as the Pay As You Drive business model. This business model can influence driver behaviour and provide a financial incentive for drivers, especially young drivers, to drive safely. Insurance companies use in-vehicle telematics to record data such as speed, location, distance travelled, and heavy braking of the driver. The recorded data is then used to calculate insurance premiums for drivers. As outlined in section 2.3, usage-based insurance has been introduced by NSW to calculate CTP insurance premiums for taxi and rideshare vehicles.

In Australia, QBE uses Pay As You Drive insurance through Insurance Box to monitor drivers holding comprehensive insurance.[69] The Insurance Box is a small plug-in device or App that uses sensors to measure driving habits. QBE uses the telematics data to calculate a DriveScore (or driver safety score), which influences the driver's insurance premium. Drivers are able to access the recorded information and are provided with insights and advice to improve their driving habits. In addition to monitoring driver behaviour, GPS data from the Insurance Box has been relied upon by Victoria Police to recover a number of stolen vehicles. However, the uptake rates for telematics devices for insurance purposes, such as Insurance Box, remains low and has not experienced the same levels of interest and use as seen in international markets. For example, the British Insurance Brokers' Association recently reported the number of live telematics based policies has reached almost one million, representing an increase of approximately 30% since 2016.[70]

[68] Cleanaway, 2017, *Cleanaview – your integrated portal for municipal waste services*, https://www.cleanaway.com.au/about-us/sustainable-future/cleanaview-your-integrated-portal-for-municipal-waste-services/.
[69] QBE, 2017, *QBE Insurance Box*, https://www.qbe.com.au/insurance-box.
[70] British Insurance Brokers' Association, 2018, *BIBA research reveals telematics based policies almost reaches one million mark*, https://www.biba.org.uk/press-releases/biba-research-reveals-telematics-almost-reach-one-million-mark/.

3 Emerging regulatory telematics

Key points

- In December 2017, the NHVR released a draft EWD Policy Framework and Standards for consultation. The policy framework and standards establish a co-regulatory framework for administering the EWD provisions in the HVNL. The NHVR plans to commence EWD operations in October 2018.
- Ministers endorsed national reforms to chain of responsibility duties at their November 2015 meeting. Telematics may be used by parties in the chain to assist their compliance with chain of responsibility obligations.
- There are further opportunities for operators to use telematics to monitor fatigue in addition to managing work and rest hours.

The following section of the review will explain emerging telematics applications used for regulatory purposes, including:

- the EWD
- chain of responsibility, and
- fatigue monitoring.

3.1 Electronic Work Diary

The EWD is an electronic recording system that can record work and rest times and may be used as an alternative to the written work diary for fatigue-regulated heavy vehicle drivers. Available in the law, but yet to be approved for use, the EWD has the potential to significantly improve fatigue management.

The policy intent of record-keeping requirements is to improve road safety by increasing visibility of driver activity and to reduce opportunities for driving while impaired by fatigue. The EWD can assist drivers to comply with the law and contribute to a systems-based approach to managing driver performance in the context of chain of responsibility. These benefits are underpinned by higher visibility of work and rest hours and improved accuracy, accessibility and self-compliance. Enforcement can also be improved – the accuracy and higher probability of detection enables regulators and enforcement agencies to intelligently assess risk and identify high non-conformance. The EWD generates information that can be accessed wirelessly by regulators and enforcement agencies. The EWD may be linked with other telematics systems to improve the efficiency of heavy vehicle operations.

EWDs are expected to:[71]

- improve data accuracy and transparency to drivers, transport operators and authorised officers
- provide real-time data which enables transport operators to respond immediately to actual breaches and monitor performance over time, and
- provide in-vehicle driver information which enables drivers to plan their work and rest and take action when alerted to an imminent or actual breach.

[71] National Heavy Vehicle Regulator, 2017, *Electronic Work Diaries (EWD),* https://www.nhvr.gov.au/safety-accreditation-compliance/fatigue-management/electronic-work-diaries-ewds.

The NHVR has responsibility for implementation of the EWD and approval of EWDs. At this time, no EWDs have been approved for use. In December 2017, the NHVR released a draft EWD Policy Framework and Standards for public consultation. The policy framework and standards establish the co-regulatory framework for administering the EWD. The NHVR board will have responsibility for approving the policy framework and standards, and the NHVR is planning to commence EWD operations in October 2018.

Unlike the IAP, the NHVR has adopted a model that does not require government certification of electronic recording systems. This remains consistent with the EWD provisions in the HVNL (which only requires the NHVR to approve an electronic recording system, with no requirement for third-party certification).

Subject to ongoing consultation, key features of the EWD model being considered by the NHVR include:[72]

1. With NHVR Board approval, the NHVR sets performance-based standards for electronic recording systems to be used as EWDs and approves candidate systems that meet the performance expectations.
2. Transport operators can develop their own or buy commercial systems for the fleet or drivers, enrol their drivers with their technology provider and arrange for their drivers to be trained to use the EWD.
3. Drivers will log into the EWD at the start of their shift and make work and rest declarations. Historic EWD information is automatically downloaded so that drivers can comply with the requirement to carry their last 28 days of records. Drivers' EWD information will be sent to their record keeper by the technology provider under contract to the transport operator. If a driver is approaching a work limit, the EWD can warn the driver of the potential breach.
4. If a driver is intercepted, the driver will provide the EWD record to the authorised officer (or, if it is physically tethered to the vehicle, allow the officer to view it). EWDs will be required to have a standardised 'roadside view' that visually replicates the written work diary daily sheet. If the officer wants to copy the information, a picture of this screen can be taken, or the officer can have it sent via a secure email from the technology provider.
5. If the system is not working properly, the driver must notify either the NHVR or the record keeper who will in turn notify the NHVR, and arrange for the EWD to be repaired. Drivers can use supplementary records for up to seven days while the EWD is being repaired.

3.1.1 How EWDs compare to the electronic logging device in the United States

Since December 2017, all commercial drivers in the United States who are required to prepare hours-of-service records must use an electronic logging device (ELD) to record hours of work and rest.[73] The ELD is the American equivalent of the EWD in Australia.

An ELD is a device that automatically records date, time, location information, vehicle miles, vehicle and driver identification, authenticated user and the motor carrier. ELDs are not required to collect data on vehicle speed, braking action, steering function or other vehicle performance parameters. ELDs are only required to collect data to determine compliance with hours of service regulations. The Federal Motor Carrier Safety Administration (FMCSA) estimates that ELDs will prevent 1,844 crashes, 562 injuries and

[72] ibid.
[73] Federal Motor Carrier Safety Administration, 2015, *Electronic Logging Devices and Hours of Service Supporting Documents – Final Rule,* https://www.gpo.gov/fdsys/pkg/FR-2015-12-16/pdf/2015-31336.pdf; an AOBRD may be used until December 2019.

save 26 lives each year.[74] The ELD Rule technical specification sets out that an ELD must support one of two options for electronic data transfer:[75]

- telematics transfer type – at a minimum it must electronically transfer data to an authorised safety official on demand via wireless Web services and email, or
- local transfer type – at a minimum it must electronically transfer data to an authorised safety official on demand via USB2.0 and Bluetooth.

In addition to the above, the ELD Rule states that both types of ELDs must be capable of displaying a standardised ELD data set to authorised safety officials via display or printout.

The FMCSA model is not dissimilar to the approach adopted by the NHVR. The FMCSA has not required pre-approval government certification of ELDs, and the regulation focuses on regulating carriers rather than regulating ELD service providers. The FMCSA does this by introducing a comprehensive audit regime and by introducing sanctions and penalties directed at carriers (not their service providers) if the ELD is tampered with, is not working or is not being used properly. This is broadly consistent with the EWD provisions in the HVNL that place legal obligations on heavy vehicle operators, as record-keepers, with shared liability extended to any contracted third parties.

The FMCSA has developed minimum technical standards for ELD service providers to meet. ELD service providers self-certify that they meet these minimum standards, and the FMCSA will undertake a preliminary examination of the ELD to assess whether it meets the minimum technical standards, after which the ELD is registered on the FMCSA website. The FMCSA's assessment is not an approval process and is not a certification that the ELD meets the requirements of the ELD Rulemaking and will function properly. It remains the responsibility of the carrier to ensure this.

Motor carriers and drivers must only use an ELD that is registered on FMCSA's website. Motor carriers have eight days from notification that an ELD is non-compliant to replace the ELD with a compliant one. As of January 2018, there are 279 ELDs registered on FMCSA's website.

3.2 Chain of responsibility obligations

Chain of responsibility is a legal concept in the HVNL that recognises that on-road offences may be influenced by off-road parties. It seeks to capture all parties whose influence on the chain may lead to the occurrence of an offence, or in the positive, may influence compliance. Chain of responsibility therefore captures heavy vehicle drivers and operators but also consignors and consignees, contractors, employees, schedulers, loaders and packers, as well as extending personal liability to company executives.

There may be opportunities for telematics to be used by parties in the chain to assist their compliance with obligations. For example, driver information in an EWD may also benefit schedulers who can accurately match EWD data with real-time scheduling and thereby be responsive to drivers' remaining work and rest hours. Real-time information will also allow fleet managers to proactively anticipate potential breaches as events unfold.

Depending on the extent to which telematics data underpins improved risk management and compliance with the law, telematics may also assist parties to demonstrate that reasonable steps were taken to meet their chain of responsibility obligations. The inclusion of telematics within chain of responsibility should be carefully approached to ensure the adoption of telematics does not become a superficial demonstration of compliance without recourse to improved management systems and beneficial analysis of

[74] ibid., p. 78294.
[75] ibid.

the data it provides. It is also important that any recognition of telematics in relation to chain of responsibility does not create a de facto mandate of telematics in the industry or create an unintended expectation that parties in the chain can only meet their obligations by installing and using telematics systems.[76]

3.2.1 Primary Duty of Care in the HVNL

Ministers endorsed national reforms to chain of responsibility duties at their November 2015 meeting. The bill with the chain of responsibility changes was agreed by ministers in early 2016. This bill was passed by Queensland parliament, the host jurisdiction for the HVNL, on 1 December 2016 and will amend the HVNL. These amendments will commence on a date to be proclaimed. This is likely to be in mid-2018 to allow for an appropriate implementation period.

What will the reforms achieve?

The reforms reformulate the existing obligations of current chain of responsibility parties as a primary duty of care to ensure, so far as reasonably practicable, the safety of road transport operations.

The primary duty of care will apply to all current chain of responsibility parties based on the role they perform within the chain, limited to the existing regulatory framework of the HVNL, and to the extent such persons:

- manage or control road transport operations, and/or
- engage in conduct that will result in, encourage or otherwise provide incentives in relation to the conduct of road transport operations.

Depending on the chain party, the primary duty of care will therefore cover chain of responsibility obligations relating to speed management, driver fatigue, MDL and vehicle standards.

Impact of the reforms on regulatory telematics

Information generated by telematics could be used by operators and other parties in the chain to demonstrate that they have met their obligations in the HVNL. This has always been the case since the introduction of chain of responsibility obligations in 2008.

The chain of responsibility obligations do not prescribe telematics or technology solutions. It is the responsibility of the chain party to decide how to meet their obligations.

A primary safety duty increases the likelihood and necessity that parties in the chain will introduce systems and technologies to monitor key activities, including vehicle location, speed, mass, loading and other relevant information. The primary safety duty will effectively require operators and other parties to collect and analyse this information for them to demonstrate that they have taken reasonable steps to meet the primary safety duty.

Enforcement powers are also being reviewed in light of the introduction of a primary safety duty to ensure that enforcement agencies have adequate powers to investigate potential chain of responsibility offences.

These changes alter the compliance and enforcement landscape in which regulatory telematics are operating in. In particular, when the IAP was first introduced, road agencies did not have any other mechanisms to ensure that vehicles did not operate outside of a designated road network. The changes to chain of responsibility, and in particular the introduction of a primary safety duty accompanied with increased enforcement powers,

[76] National Transport Commission, 2014, *Delivering a Compliance Framework for Heavy Vehicle Telematics*, Policy Paper, p. 18, https://www.ntc.gov.au/Media/Reports/(460859F4-7E0B-9B53-55E3-CB14E482E71A).pdf.

means that governments will have an expanded source of information to draw on to prove an offence, or intelligence to initiate or conduct an investigation.

The chain of responsibility obligations extend to a range of parties, not just the transport operator. It is highly likely that information related to chain matters, such as the location and mass of a vehicle, will be collected by different parties to meet their own obligations. This limits the potential impact of one chain party concealing or altering data to avoid prosecution. The chain of responsibility reform therefore also potentially reduces the need for government to oversee data collection and data integrity.

3.3 Fatigue monitoring

There are further opportunities for operators to monitor fatigue in addition to managing work and rest hours. Drivers must be fit for work and telematics can provide operators with information on fatigue and distraction. At this stage, there is not a strong role for government to play in this space; however the National Heavy Vehicle Accreditation Scheme (NHVAS) provides a potential platform to recognise Advanced Fatigue Management (AFM) applications.

AFM brings a risk management approach to managing heavy vehicle driver fatigue. AFM allows operators to propose schedules of work and rest within a Risk Classification System (RCS) [77] assessed by the NHVR. The RCS helps to assess the levels of fatigue risk associated with combinations of work, rest and sleep and is based on fatigue science and research. The RCS allows operators to submit work schedules with higher risk potentials (such as longer or more frequent shifts) that are mitigated by offsetting across seven key fatigue management principles.[78] The RCS is used by the NHVR when assessing AFM applications and provides greater transparency on application decisions.[79]

Technology has evolved and presented opportunities for operators to detect and monitor fatigue levels across their fleet. Optalert and Seeing Machines are two examples of how technology is being used to detect and monitor fatigue in Australia.

Optalert technology continually measures driver drowsiness using a system of infrared reflectance oculography housed in a pair of glasses.[80] The glasses emit and detect low levels of infrared light to sense movements in the eyes and eyelids. These movements are measured using the Johns Drowsiness Scale. The scale provides a real-time measure (from 0.0 to 9.9) of the subject's drowsiness level, and notifies the driver when their level of alertness shows a risk. The first warning is emitted when the driver reaches 4.5 on the scale, which is equivalent to a 0.05 BAC.[81] The data captured by the glasses is shared with the operator, assisting in determining the nature and size of their fatigue risk.

Seeing Machines have developed technology to interpret the human face and eyes in order to detect the symptoms of fatigue.[82] Seeing Machines' technology uses two cameras placed on the cabin of a truck, plane or train, which are pointed at the driver or pilot. The cameras measure the drivers' head pose and orientation, their eyelid closures, pupil diameter and direction of their gaze. This information is analysed to determine whether the driver is alert, drowsy or inattentive. If a driver is found to be drowsy or distracted, the driver's seat vibrates and an alarm sounds to wake them up.

[77] National Heavy Vehicle Regulator, 2017, *Advanced Fatigue Management*, https://www.nhvr.gov.au/safety-accreditation-compliance/fatigue-management/work-and-rest-requirements/advanced-fatigue.
[78] ibid.
[79] ibid.
[80] Optalert, 2017, *Why Optalert,* http://www.optalert.com/it-works.
[81] Catalyst, 2011, *Optalert,* http://www.abc.net.au/catalyst/stories/3280461.htm.
[82] Seeing Machines, 2017, *Industry Applications Fleet*, https://www.seeingmachines.com/industry-applications/fleet-guardian/.

These technology solutions, when combined with positive and timely management intervention at the operator level, can significantly reduce fatigue related risks.

4 Stakeholder views on regulatory telematics

Key points

- Organisations that have invested in IAP strongly promote the value of certification, and champion the certainty it provides governments and operators that electronic records are accurate and dependable.
- Organisations that have not invested in IAP largely welcome the NHVR's approach to EWDs. These organisations broadly expect the NHVR's approach will be balanced, support innovation and be more cost-effective, recognising that the accuracy and reliability of written work diaries is already challenging. The NHVR's approach is expected to drive greater uptake of EWDs, which could have significant safety and efficiency benefits.
- Industry supports greater use of regulatory telematics to increase safety, compliance and network outcomes. Many operators recognise that telematics can support a range of applications that feature government access to data, including mass and speed monitoring, fatigue management and road user charging. Governments are seeking to maximise the use of telematics data to underpin risk-based intelligence and compliance activities.

There are diverse attitudes towards telematics across the industry, with many transport operators only using telematics to track vehicle location for commercial purposes. In terms of the uptake of regulatory telematics and the role of government, it is striking the extent to which stakeholder views vary depending on whether an organisation has chosen to invest in IAP. These viewpoints reconfirm the principle underpinning the *Compliance and Enforcement Framework for Heavy Vehicle Telematics* that government certification of regulatory telematics – and the regulation of service providers – will depend on the circumstances in which the information generated by telematics is intended to be used.

Industry stakeholders advised they were using the IAP and other regulatory and commercial telematics applications for the following reasons:

- safety, including monitoring speed compliance, fatigue and to meet chain of responsibility obligations
- productivity gains associated with greater road access and higher mass limits
- calculating fuel tax credits and distance charging for kilometres
- fleet management, including maintenance of fleet and vehicle location, and
- in house purposes, including payroll, hours worked and providing customers with accurate arrival times.

The NHVR recommends three key principles to ensure successful delivery of regulatory telematics:

1. Ensure relevant parties in the freight task (industry, state and local government, supply chain partners) agree the safety and productivity outcomes that telematics can help achieve i.e. the problem and outcome must be identified before the solution is developed.
2. Leverage and "share" benefits from the huge investment transport companies have already made in telematics by setting minimum standards, rather than mandating a prescriptive piece of technology or "black box".

3. Establish appropriate national governance arrangements, including clear policies that articulate the purposes for which the data will be collected, consistent application of policies across the country, a relevant 'authority' to maintain the standards and requirements and ensuring unnecessary costs are not imposed on industry.

4.1 Intelligent Access Program

4.1.1 Use of the Intelligent Access Program

During consultation, road transport agency stakeholders advised they are monitoring vehicles enrolled in the IAP primarily for asset protection purposes. In New South Wales and Queensland, agencies are predominantly using IAP to monitor HML access, while Victoria is predominantly using IAP to monitor over-dimensional crane access. IAP is used as a tool to ensure the integrity of a permit or exemption notice is maintained – the program itself does not determine network access, and the uptake of IAP is entirely driven by what vehicle types or schemes each road transport agency determines should have IAP. It provides an additional safeguard that the terms of the permit or notice are being complied with.

Some road transport agencies are using IAP for broader purposes, such as on-board mass and, in Queensland, IAP information is used to monitor speed and to follow-up speed compliance with operators for educational purposes.

Industry stakeholders have diverse views on the value of IAP. A common concern raised by many stakeholders included that the:

- IAP provides a high degree of certainty and clearly defined roles and responsibilities, but it is highly controlled and a very structured model that will not always be proportionate, necessary or cost effective for every regulatory application, and
- IAP is inconsistently applied across states and territories. There are no agreed national principles or policies that determine why some applications are in IAP, and others are not, and this creates uncertainty for transport operators and service providers when making investment decisions.

The IAP is not only inconsistently applied across states and territories, but the review could not obtain any evidence or information about any road transport agency undertaking a cost benefit analysis or structured regulatory assessment before or after requiring IAP as a condition of access to the network.

The absence of any identifiable cost benefit analysis to apply the IAP as a mandatory condition of operation, notably in the crane sector in Victoria, was raised as an issue of concern by a number of industry stakeholders. Crane operators regard IAP as an additional administrative cost that does not provide any operational benefits, particularly when taking into consideration that the benefits of innovation and telematics in the crane industry relate to the operation of the crane and lift productivity and safety, which is their core activity, not the transport of the crane itself. The crane industry is supportive of the IAP if it facilitates a transition from permits to gazetted notices to manage road access.

In markets where IAP is voluntary (e.g. HML and performance-based standards vehicles), it is clear that operators that have invested in IAP are making a return on investment. This will depend on the policy setting in each state and territory (which permits or exemptions require IAP) and each operator's market and business model.

Industry stakeholders have mixed views around how well-informed industry are about the options and benefits of telematics technology. Transport operators are highly receptive to business efficiencies, and the decision not to invest in the IAP is often because the

business case to invest is not sufficient, rather than because of misinformation about the IAP or being uninformed about the opportunities of the IAP.

Service providers commented that clients prefer to have the least number of in-vehicle units to reduce costs and to leverage operational efficiencies through having single sources of data. However, the review did not identify or speak to any operators that have integrated IAP into one seamless telematics solution, bringing together both commercial and regulatory applications. One operator was able to integrate all telematics applications into one system *except for IAP*, because of IAP's specified requirements.

Some operators noted that the reliability of IAP data is reduced when drivers are required to manually enter vehicle mass and configuration. Drivers can make deliberate or inadvertent declaration errors.

Some service providers and operators noted there have been issues with only allowing a limited number of technicians to install and perform annual checks of the IAP system. This can be a significant issue and barrier for operators located in rural and regional areas. For example, one operator advised that they or the technician must travel 600km (round trip) to perform the annual IAP inspection. This trip has to be repeated for each of the vehicles in the fleet with IAP, as the annual inspection dates can vary. If the technician or operator cannot attend on the annual inspection date then the operator cannot use the vehicle.

4.1.2 Benefits of the Intelligent Access Program

Service providers that have invested in IAP strongly promote the value of certification, and champion the certainty it provides governments and operators that electronic records are accurate and dependable. Conversely, service providers that have not invested in the IAP claim that certification inhibits uptake of telematics, is uneconomical and accurate records can be addressed through audit-based self-certification approaches.

The IAP also enables service providers to differentiate themselves in the market and to create a level playing field.

Operators that use IAP noted the benefits of IAP include greater network access and enhanced commercial opportunities. They see tangible productivity benefits with the IAP due to greater access, which one service provider observed could be commercially a highly valuable financial proposition, compared to less tangible propositions such as fatigue management.

Road transport agency officials who use IAP on a regular basis value the certainty it provides that operators are route-compliant. While IAP does not guarantee location information will always be accurate, TCA provides certificates of evidence that clarify whether IAP was working at a point in time

Service providers advised operators are gaining a significant economic advantage when running HML. One interviewee provided an examples of the cost of the IAP for a vehicle being recovered from one extra pallet per trip.

Transport operators commented that telematics data can be used as a tool to develop targeted training for staff and to motivate drivers to modify their behaviours to become a safer driver.

Findings

- Service providers that have invested in IAP strongly promote the value of certification, and champion the certainty it provides governments and operators that electronic records are accurate and dependable. Conversely, service providers that have not invested in IAP claim that certification inhibits uptake of telematics, is uneconomical and accurate records can be addressed through audit-based self-certification approaches.

- Road agency officials who use IAP value the certainty it provides that operators are route-compliant. While IAP does not guarantee location information will always be accurate, TCA provides certificates of evidence that clarify whether IAP was working at a point in time.
- Operators that voluntarily use IAP are positive about the economic benefits and the return of investing in the IAP.
- Crane operators that must use the IAP to operate on public roads regard IAP as an additional administrative cost that does not provide any operational benefits. The crane industry is supportive of IAP if it facilitates a transition from permits to gazetted notices to manage road access.
- Transport operators that **do not use** IAP, and peak bodies, believe that IAP is a government-imposed cost with little benefit. There is a perception in industry that IAP is expensive and industry does not have certainty as to what specific applications will be included in IAP in the future.

4.1.3 Barriers to uptake of the Intelligent Access Program

The primary barrier to industry taking up IAP is cost. For the large majority of transport operators in Australia, IAP does not provide a positive economic return because the entry and ongoing costs of certification outweigh the productivity benefits. As noted above, this is primarily driven by the vehicle types included in IAP in each state and territory. Clearly, the cost of government certification by TCA can be either very substantial or very marginal depending on the productivity gained in return for being in IAP. This is determined by each road transport agency's decision-making as to what is included in IAP, and each transport operator's business model; it is not directly determined by TCA or IAP.

Telematics service providers advised that TCA charge a service provider an operational fee of $39 per month and the service provider then charge their clients a service fee around $80 to $250 per month.

Some service providers, not certified by TCA, advised their products do not meet TCA's *Telematics In-Vehicle Unit (IVU) Functional and Technical Specification* and they do not intend to seek type-approval or certification. Service providers noted this was due to the cost of applying and approval relative to the size of the market.

Service providers estimated the cost of developing an IAP solution and having it certified by TCA to be between $500,000 and $2 million (including internal administrative processes and stakeholder consultation) and takes around one year.

Service providers with operations in international markets noted there are no certification fees in New Zealand and the United States, and as a result these fees are not passed on and absorbed by customers.

Findings

- Initial and ongoing costs of IAP certification are substantial. Service providers spend between $500,000 and $2 million to certify a system for the IAP and around 27% of an operator's monthly IAP fee goes back to TCA. TCA advised the costs associated with the IAP are commensurate with investments required to provide traditional, certificate-based regulatory systems used by road agencies.

4.1.4 Other issues with the intelligent access program

There are a range of other issues raised by stakeholders that are detailed below. In broad terms, there are opportunities to improve the accuracy of IAP to better manage non-

conformance reports, and there are opportunities to leverage IAP data to improve network management and investment decision-making.

Other issues raised by stakeholders include:

- IAP provides road transport agencies with non-conformance reports retrospectively. TCA advised that road transport agencies receive non-conformance reports within no more than 72 hours after the alleged breach of an access condition. Road transport agencies analyse the non-conformance reports around one month after the alleged breach of an access condition. There is a missed opportunity for road transport agencies to proactively manage real-time safety and infrastructure risks.
- There are legislative restrictions on IAP service providers providing non-conformance reports to IAP operators. Without timely and accurate information about when a driver has breached an access condition, operators have limited opportunities to actively manage access condition breaches. During the 2014 review of the IAP it was noted that service providers can provide some information about instances of non-conformance to operators.[83] The types of information that can be shared will be set out in the contract between the service provider and operator. In 2014, to help reduce confusion about this issue the NTC recommended that TCA publish information about the data that operators are able to obtain from service providers.[84] TCA published a fact sheet which outlined that transport operators are entitled to position, speed and self-declaration records collected from vehicles they have enrolled in the IAP.[85] The fact sheet also advised that transport operators own the IAP data collected from their vehicles and can obtain the data from their service provider for no additional cost.[86]
- Industry commented that IAP restricts the provision of feedback to operators about non-conformance and it has become a regulatory requirement to operate HML, without leveraging opportunities to improve transport operations. A number of operators and peak bodies questioned whether government is actively monitoring the IAP data as so few operators receive follow up actions for non-conformance.
- IAP does not provide network managers with any information about what IAP vehicles, or vehicle combinations, have used the network, or when. The HVNL allows TCA to use or disclose IAP information for research purposes; however road transport agencies believe there is a missed opportunity for aggregated and de-identified IAP data to be leveraged to assess network demand and to support asset investment decisions. TCA advised Queensland, New South Wales, Victoria, Western Australia and South Australia currently use aggregated IAP information for road network planning and reporting purposes.[87]
- IAP would offer industry significant value if it could be used as a tool to provide real-time alerts and information to drivers about route compliance, as well as real-time information about speed zones, rest area locations and roadworks.
- Road transport agencies commented they would welcome more opportunities to use telematics to underpin intelligent risk-based enforcement, but there needs to

[83] National Transport Commission, 2014, *Review of the Intelligent Access Program*, Consultation Paper, p. 38, https://www.ntc.gov.au/Media/Reports/(969A07AB-745D-49C7-9DB2-2D5249230978).pdf.
[84] ibid.
[85] Transport Certification Australia, *Fact Sheet: Access to IAP data by transport operators*, https://tca.gov.au/documents/pdfs/Fact%20Sheet_IAP%20Data%20Collection.pdf.
[86] ibid.
[87] The NTC has not confirmed with Queensland, New South Wales, Victoria, Western Australia and South Australia that they are using aggregated IAP information for such purposes.

be more vehicles enrolled in the IAP to make the risk assessment accurate and meaningful.

- Service providers believe that the current system is prescriptive and is not promoting innovation. On-going IAP costs are high for both operators and service providers. Telematics service providers commented that the system should allow operators to demonstrate compliance instead of allowing regulators to monitor compliance.
- Operators are required to obtain a separate IAP certificate for the same vehicle in each jurisdiction. This increases duplication and administrative burden.

Findings

- IAP provides road transport agencies with non-conformance reports retrospectively, within no more than 72 hours after the alleged breach of an access condition. Road transport agencies analyse the non-conformance reports around one month after the alleged breach of an access condition. There is a missed opportunity for road transport agencies to proactively manage real-time safety and infrastructure risks.
- There are legislative restrictions on IAP service providers providing non-conformance reports to IAP operators. Without timely and accurate information about when a driver has breached an access condition, operators have limited opportunities to actively manage access condition breaches.
- IAP does not provide network managers with any information about what IAP vehicles, or vehicle combinations, have used the network, or when. The HVNL allows TCA to use or disclose IAP information for research purposes; however road transport agencies believe there is a missed opportunity for aggregated and de-identified IAP data to be leveraged to assess network demand and to support asset investment decisions.
- Industry supports greater use of regulatory telematics to increase safety, compliance and network outcomes. Many operators recognise that telematics can support a range of applications that feature government access to data, including mass and speed monitoring, fatigue management and charging. Governments are seeking to maximise the use of telematics data to underpin risk-based intelligence and compliance activities.

Road transport agencies receive false positive non-conformance reports

Road transport agencies stated they receive a high number of false positive non-conformance reports due to the geofencing of routes and basic parameters around the radius of vulnerable assets and infrastructure, as set out in TCA's specification.

There are four key elements that contribute to the number and accuracy of non-compliance reports under the current Intelligent Access Map (IAM): quality road network map data, up-to-date road network access conditions, accurate GNSS and additional access conditions as decided by road transport agencies.

Road transport agency stakeholders advised they receive approximately 25,000 to 70,000 non-conformance reports per month; however the majority are false positives. There are a range of reasons for the high number of false positives occurring. TCA advised it is due to the method used by road managers and regulators to set the electronic monitoring conditions for vehicles (which may not align with the road access conditions granted), however other factors were identified by road transport agencies, including limitations of mapping and GNSS in the IAP specification. This requires a manual reconciliation of permits against non-conformance reports. Agency staff commented this is a manageable

process but there is room for improvement in the parameters set out in TCA's specification.

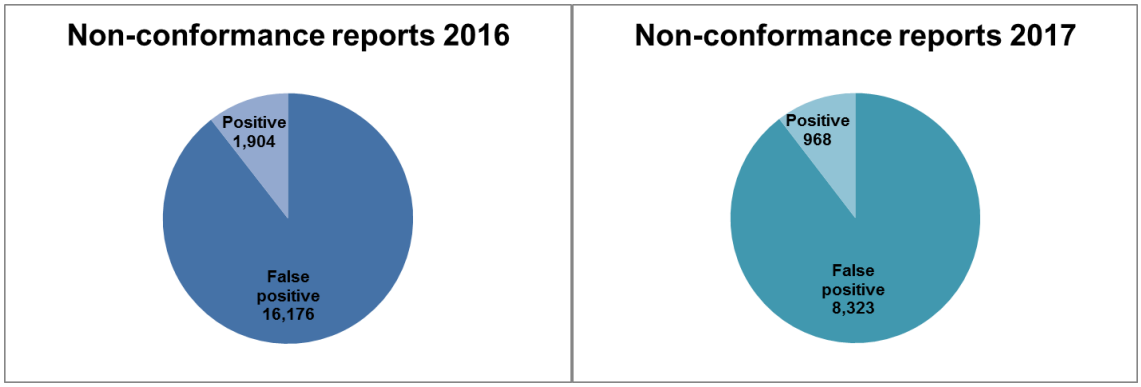
TCA reported some jurisdictions have adopted an administrative approach where the crafting of IAP monitoring conditions do not necessarily reflect the conditions of access articulated in regulations, notices, gazettes or permits. TCA noted in some instances this is done inadvertently, however in other instances, it represents an attempt to collect a greater amount of data from vehicles monitored through the IAP. TCA believes operators may not be aware of this additional monitoring.

Two road transport agencies confirmed they monitor heavy vehicles under IAP including cranes, some PBS vehicles and some vehicles participating in the OBM solution, through geo-fencing of vulnerable structures, including bridges. This means that a non-conformance report is generated each time the vehicle travels over, under or in parallel to the structure, even if the vehicle is compliant with its access conditions. Agency staff advised that decisions to monitor for additional conditions have been made in close consultation with operators, and those operators who are being monitored for additional conditions have been notified. Agency staff commented that all jurisdictions should be consistent with this approach, as it is the most efficient and cost-effective way to determine whether a vehicle has in fact traversed over a vulnerable asset.

TCA suggested the high number of non-conformance reports are generated as a result of this administrative approach. Agency staff agreed the high number of non-conformance reports are a result of the geo-fencing of structures, but noted they value this data and would like to maintain this approach. TCA commented there is an opportunity to tighten the legislative requirements for the IAP, so that monitoring conditions are in direct alignment with the access conditions granted by road managers and regulators.

Road transport agency stakeholders advised they employ anywhere from 2 to 8 full time staff to manually analyse the reports and routes taken by operators on a monthly basis. This means the data is always one month behind and is not reviewed in real-time. Agency staff advised that if a non-conformance report is detected inspectors will undertake investigations as to whether a permit exists. If a permit does not exist, inspectors will visit the operator or driver with an educational focus seeking to produce a change of behaviour. If the non-conformance continues, inspectors will issue a warning letter or Improvement Notice. If the breaches still continue, road transport agencies will prosecute. Based on this compliance and enforcement approach one road transport agency has seen the number of breaches halve over one year. The road transport agency advised advised in 2016 they received 16,176 false positive non-conformance reports and 1,904 positive non-conformance reports. In 2017, this figure halved with 8,323 recorded false positive non-conformances and 968 positive breaches detected (Figure 5).

Figure 5. Road transport agency non-conformance reports 2016 and 2017[88]



[88] Figure 5 is based on one road transport agency only.

New South Wales has been successful in 15 crane-related prosecutions for access breaches. However, while IAP certifies vehicle location, other elements of proving an offence (typically mass and trailer combination) rely on self-declaration. This may indicate why there have been no IAP prosecutions in relation to HML, or other vehicle combinations, where – unlike cranes – mass and vehicle combinations are variables. However, some road agencies – such as Queensalnd – are more focused on using IAP for education and compliance purposes and are not focused on any potential prosecution challenges. TCA have reported higher levels of assurance may emerge in the future through the OBM program, which will link location, speed, time, vehicle configuration and mass data through the use of a type-approved OBM System.

Findings

- IAP generates many false positives. For example, New South Wales processes 70,000 non-conformance reports a month. Nationally, over 1 million non-conformance reports are dealt with annually – the majority are false positives. There are a range of reasons for the high number of false positives occurring. TCA advised it is due to the method used by road managers and regulators to set the electronic monitoring conditions for vehicles (which may not align with the road access conditions granted), however other factors were identified by road transport agencies, including limitations of mapping and GNSS in the IAP specification.
- Road transport agencies have only prosecuted crane operators under IAP (New South Wales has had 15 successful prosecutions). IAP certifies vehicle location, but other elements of proving an offence (typically mass and trailer combination) often rely on self-declaration. This may indicate why there have been no IAP prosecutions in relation to vehicle types that have variable mass and vehicle combinations. However, some road transport agencies, such as Queensland, are focused on education and compliance rather than prosecutions. TCA have reported higher levels of assurance may emerge in the future through the OBM program, which will link location, speed, time, vehicle configuration and mass data through the use of a type-approved OBM System.

Service providers receive mapping errors

Service providers explained the IAM process could be more agile. IAP maps are currently only updated quarterly, and some jurisdictions have elected to link the updates to road access conditions at the same time. As such, there is a time lag between road access conditions being represented on IAP maps. They commented there needs to be a way to eliminate map lags to ensure the IAM and access condition data is accurate and up-to-date. They commented the process involves road transport agencies translating information to a form that can be used by the IAP system and providing map layers to TCA. TCA then provides the map layers to service providers on a quarterly basis to create one IAM, meaning the map is always out of date. Service providers advised there are issues with them testing routes once they receive the map from TCA, causing duplication of effort by service providers. They noted any formatting or human error caused by road transport agencies affect the ability for service providers to test and use the IAM. Road transport agencies reported they use their own map as the source of truth, not the TCA consolidated map.

TCA advised there is an opportunity to address this issue through updating road access conditions granted by road managers more frequently (in a separate process from the quarterly road network map update).

Finding

- Certified IAP service providers seek more accurate, reliable and timely IAP mapping and road access condition information. IAP maps are updated quarterly, and some jurisdictions have elected to link the updates to road access conditions at the same time. As such, there is a time lag between road access conditions being represented on IAP maps. There is an opportunity to address this issue through updating road access conditions granted by road managers more frequently (in a separate process from the quarterly road network map update).

Recommendation

Recommendation 1: That TCA examines the feasibility of improving the IAP in the following areas:

1.1 Reviewing the IAP specification to improve the accuracy of vehicle location, mapping information and alarm records, with the aim of minimising the number of non-conformance reports generated by IAP.

1.2 Providing real-time information to IAP service providers and operators, including underlying navigable data (for example, to support dynamic decision-making when roadworks result in unexpected road closures).

1.3 Improving business processes to manage access and map updates in a timelier manner, and to rationalise IAP certificates.

1.4 Any other areas that would improve the value, efficiency and affordability of IAP for government and industry.

Lead agency: TCA, in collaboration with the NHVR, the road transport industry, technology providers and road transport agencies.

Timeframe: deliver a business case with timeframes to the Council by November 2018.

4.2 Other regulatory telematics

4.2.1 Benefits of regulatory telematics

Industry stakeholders identified safety as the key benefit of regulatory telematics. Industry primarily uses telematics to monitor location, which is facilitating monitoring of permits and speed compliance amongst some operators. Others are also using telematics to manage driver fatigue and chain of responsibility obligations.

Road transport agencies advised they are reliant on roadside infrastructure for enforcement and would like to move towards a virtual enforcement method, reducing the capital intensive approach and increasing sustainability and efficiency outcomes. Agency staff suggested there is potential value in unlocking aggregated and de-identified data for road transport agencies to provide information to support network and investment decisions.

Industry supports the increased use of regulatory telematics. Many operators recognise the potential safety, compliance and network benefits of measuring MDL. Telematics can support a range of applications that feature government access to data, including mass and speed monitoring, fatigue management, increased network efficiency and charging. Industry believes these regulatory applications can be introduced without government certification or regulation of service providers, and could be introduced in step with the removal of permit requirements.

Some operators use telematics to monitor speed compliance, with driver alerts when speeding outside set parameters. While speed is only monitored for HML vehicles in Queensland, it can still provide operators outside of Queensland with insights into how their vehicles are being driven.

Telematics are being used to assist with fatigue management by recording work and rest times and providing certainty about the location of the driver at a point in time. Interviewees also advised they are monitoring the announcement and implementation of the EWD model.

Chain of responsibility has positively influenced some operators to make the right choices and ensure they can demonstrate compliance. Some industry stakeholders provided anecdotal evidence that some operators will not use vehicles if telematics devices are not fully functioning because of chain of responsibility duties.

However, most industry stakeholders agreed that chain of responsibility laws have not been a key driver for the uptake of regulatory telematics. They agreed that HVNL amendments in 2018 to introduce a primary safety duty and executive officer liability may address this, but increased and focused enforcement of chain of responsibility obligations would be a significant incentive to invest in regulatory telematics.

Finding

- Chain of responsibility laws have not been a key driver for the uptake of regulatory telematics. HVNL amendments in 2018 to introduce a primary safety duty and executive officer liability may address this, but increased and focused enforcement of chain of responsibility obligations would be a significant incentive to invest in regulatory telematics.

4.2.2 Barriers to uptake of regulatory telematics

Stakeholders described the barriers to uptake of regulatory telematics to include:

- policy uncertainty, and
- inconsistent application across state and territory borders, and

Policy uncertainty

Industry advised there is uncertainty around the future direction of regulatory telematics, particularly for IAP service providers. The recent change in the direction of the EWD by the NHVR has unsettled the IAP industry, effecting confidence and softening investment. As one IAP service provider explained, their clients are questioning the EWD process and asking “if EWD goes this way, then why logically won’t the IAP go that way too?”

Industry raised concerns around the current legislative frameworks for the IAP and EWD, particularly around a lack of a common approach. For example, some operators are unsure whether their type-approved devices already installed in heavy vehicles will satisfy the proposed EWD model.

Some operators commented that the IAP is legislative heavy and EWD is possibly too far the other way. However, a number of operators and service providers favoured the proposed EWD model involving meeting minimum standards, as opposed to mandating a technology solution or operating framework. In their view, the proposed EWD model should drive down costs and support innovation by removing government certification. However, most operators and service providers agreed that it remains to be seen whether this model addresses risks related to the integrity and evidentiary value of EWD records, particularly in the context of roadside enforcement. After reviewing the content of the proposed EWD Policy Framework and Standard in mid-December 2017, the Australian Trucking Association (ATA) has stated:

> *The current draft policy and standards offer insufficient tolerances and no flexibility, leaving drivers exposed to inconsequential technical breaches that will have no impact on safety. The inadequate numbers, capacity and frequency of formal rest areas nationwide exacerbates this issue.*[89]

Further, the Australian Logistics Council (ALC) has stated:

> *The EWD Policy Framework and Standard should be developed with a view to be consistent with, or be incorporated within, the National Telematics Framework.*[90]
>
> *This means the Telematics Data Dictionary (which would allow the EWD Standard to be aligned with the data definitions and formats used across other telematics applications) and the Telematics In-Vehicle Unit (IVU) Specification should be the relevant standard on which a compliant EWD should be based, if for no other reason than the cost that would be imposed on operators who purchase an EWD complying with one technical standard, and then must shortly thereafter purchase a unit complying with a different standard.*[91]

In addition to the uncertainty, operators and service providers who have not invested in IAP commented that the lack of IAP prosecutions – and no IAP prosecutions outside of the crane sector in New South Wales – indicates there is limited evidence to demonstrate that the IAP is effective from a prosecution perspective, and that the IAP produces more robust and accurate evidence and than through alternative means. Industry scepticism in the IAP is high, and there is a consistent view that the system should be more dynamic and flexible. For example, by allowing operators to enrol or disenrol rapidly in the IAP.

While governments are concerned about the evidentiary quality of regulatory telematics, operators and peak bodies observed that the fear of prosecution is a substantial reason why many operators will not invest in regulatory telematics. This appears to be particularly true of smaller operators.

Another reason operators and peak bodies cited for not investing in IAP or the EWD is a lack of confidence about enforcement agency access to electronic records. While recognising that the HVNL has legislated tolerances for small breaches when using an EWD, some operators are concerned about governments focusing on small breaches and not systemic breaches or patterns of behaviour. Service providers operating in international markets noted that government access to electronic records in other jurisdictions, such as New Zealand and the United States, is more restricted and could be considered as an alternative model. For example, regulatory telematics could be used to underpin compliance and education activities rather than enforcement – or, rules relating to government access of electronic records could restrict access to roadside enforcement or when there is a reasonable suspicion of a breach, rather than allowing big data analysis to identify breaches. The recent change in the direction of the EWD model by the NHVR has shifted closer to a restricted approach by focusing on peer-to-peer communication at the roadside, rather than compliance asesssment software that has back-office analysis functionality.

Uptake of regulatory telematics is therefore likely to remain low until there is a published compliance and enforcement policy that clearly-defines in what circumstances enforcement agencies will access and use telematics data. The development of a compliance and enforcement policy would require close consultation with police to ensure it could be integrated with current policing enforcement practices.

---

[89] Australian Trucking Association, 2018, *Electronic Work Diary Draft Policy Framework and Standard*, p. 2, http://www.truck.net.au/sites/default/files/submissions/20180209ATAsubmissionElectronicWorkDiaries.pdf.
[90] Australian Logistics Council, 2018, *Electronic Work Diary (EWD) Policy Framework and Standards Feedback Form*, p. 2, http://www.austlogistics.com.au/wp-content/uploads/2018/02/ALC-Submission-NHVR-EWD-Policy-Framework-and-Standard.pdf.
[91] ibid.

Some IAP service providers are also of the view that government could do more to support regulatory telematics through procurement processes. For example, governments could require IAP on higher risk heavy vehicle operations.

Findings

- Operators and service providers are seeking greater policy certainty from governments, and clearer direction about when certification or other assurance models will be appropriate for regulatory telematics.
- Operators are reluctant to use regulatory telematics unless it is clear in what circumstances enforcement agencies will access and use telematics data. Clarity over how and when regulatory telematics data will be used as a tool to achieve heavy vehicle compliance and enforcement objectives is essential. A regulatory telematics compliance and enforcement policy should clarify when government enforcement agencies will have access to data at the roadside and/or in back-office investigations. This would significantly increase certainty for the heavy vehicle industry and should help drive uptake.
- Organisations that have invested in IAP are critical of the EWD model adopted by the NHVR. They are concerned that an assurance model that allows industry to self-assess conformance with minimum standards will not provide sufficiently accurate and reliable records for prosecutions.
- Organisations that have not invested in IAP, including heavy vehicle operators, peak bodies and other service providers, largely welcome the NHVR's approach. These organisations broadly expect the NHVR's approach will be balanced, support innovation and be more cost-effective, recognising that the accuracy and reliability of written work diaries is already challenging. The NHVR's approach is expected to drive greater uptake of EWDs, which could have significant safety and efficiency benefits.
- IAP provides a high level of trust and certainty that is unlikely to be warranted or proportionate for every regulatory application. The EWD model adopted by the NHVR is a potential approach for other applications. The EWD model does not rely on a government agency to certify or regulate service providers. This is expected to drive down costs and support innovation, but it remains to be seen whether this model addresses risks related to the integrity and evidentiary value of EWD records.
- Some service providers are of the view that government could do more to support regulatory telematics through procurement processes. For example, governments could require IAP on higher risk heavy vehicle operations.

Recommendations

Recommendation 3: That the NHVR develops and applies a national compliance and enforcement policy for regulatory telematics. Working closely with road transport agencies, police and the NTC, the enforcement policy should provide regulatory certainty as to how telematics will be used to meet heavy vehicle compliance and enforcement objectives. The national policy will draw on the NTC's *Compliance and Enforcement Framework for Heavy Vehicle Telematics* and consider in what circumstances roadside enforcement can be enhanced or replaced by greater emphasis on compliance and audit.

Lead agency: the NHVR.

Timeframe: submit to Council by November 2018.

Recommendation 4: That the NHVR develops outcome performance and effectiveness measures to assess the success of the EWD model 12 months from first approval and subsequently provide a report under s 659(2)(i) of the HVNL on the extent to which those objectives have been achieved and any proposed performance or governance-related improvements (including for example the making of ministerial guidelines under s 635 for the purpose of s 343(3) of the HVNL).

Lead agency: the NHVR.

Timeframe: the NHVR develops outcome performance and effectiveness measures by the end of 2018 and a report to the Council by late 2019.

Inconsistent application across state and territory borders

Across industry, stakeholders noted that there are issues with multiple rule sets and inconsistencies between states and territories. This is partly due to different infrastructure standards, but such differences limit the value proposition of IAP for industry. For example:

- IAP is required for HML in New South Wales and Queensland, but not in Victoria and South Australia
- speed is monitored for HML vehicles in Queensland only.

Industry does not have certainty as to what specific applications will be included in IAP in the future. Operators advised that if Australia is to fully realise the projected $1.8 billion in productivity, safety and environmental benefits as anticipated when the IAP was first introduced, there must be a nationally consistent, risk-based approach to IAP.

The IAP process between states with interim certificates is administratively burdensome and there is an opportunity to look at one national certification process. The requirement for each IAP vehicle to obtain an IAP certificate in each jurisdiction is an additional cost to industry. IAP operators commented that, even with the introduction of the NHVR, they are still dealing with four different states to obtain permits and intelligent access certificates to operate within IAP.

Some operators noted that commercially the IAP becomes an additional cost with no advantage when the same vehicle and load can travel in one state and need IAP, and travel in the next and not need IAP. Inconsistencies between permit approvals across states and territories, and gaining last mile access, exacerbates these issues with IAP.

Road transport agencies and industry support the development of a Best Practice Model for Regulatory Telematics. Government stakeholders indicated that a model should support innovation, flexibility and the use of non-technology specific regulatory telematics.

Mandatory telematics

While the scope of the review did not include investigating stakeholder views around mandatory telematics for heavy vehicles, during consultation several road transport agency stakeholders, industry associations and operators indicated their support for mandatory telematics. One government agency advised they support mandatory telematics; however a national compliance and enforcement policy would need to be developed to provide operators with clarity around how the data would be used. Some operators commented that they would support mandatory EWDs if it was imposed on all drivers, including farmers and other competitors. An industry association noted that larger operators see a significant advantage in making telematics mandatory, including increasing compliance and creating an industry standard. However, one industry association advised that they strongly oppose mandatory telematics as it would lead to a situation whereby farm and mine vehicles are captured, resulting in the cost of the telematics device potentially exceeding the value of the vehicle.

The NTC is of the view that the introduction of chain of responsibility laws in 2018 may influence operators to adopt a proactive risk management approach and encourage greater uptake of regulatory telematics on a voluntary basis, including the IAP and EWD. A Regulatory Impact Statement (RIS) would be required in order to assess the costs and benefits associated with mandating any regulatory telematics application, including a clear understand of the specific problem that mandatory telematics would address.

Findings

- IAP uptake is driven by road transport agency policy settings. There are no agreed national principles or policies that determine why some applications are in IAP, and others are not. Variable state policy settings led to differences in use of IAP applications as a condition of access. For example, IAP is a requirement for HML access in Queensland and parts of New South Wales, but not elsewhere. This is largely due to varying infrastructure standards, but these differences limit the value proposition of IAP for industry.
- Governments could collaborate more with industry to co-design an agreed model for regulatory telematics applications. Such a framework could set expectations about how government and industry can reach a balance between supporting innovation and affordability while meeting minimum standards of trust and evidentiary value. Police agencies should also be consulted to ensure that telematics solutions can be accessed efficiently and reliably for roadside enforcement (when relevant).

Recommendations

Recommendation 2: That the NTC develops national guidelines that set out agreed principles and a methodology for road transport agencies to apply when assessing the costs and benefits of including new vehicle types or future applications in the IAP.

Lead agency: the NTC.

Timeframe: submit to Council by November 2018.

Recommendation 5: That, in collaboration with the NHVR, road transport agencies, the road transport industry, TCA and technology providers, the NTC co-designs a Best Practice Model for Regulatory Telematics. The best practice model should provide a technology- and application-neutral model that supports the use of regulatory telematics data to achieve heavy vehicle compliance and enforcement objectives, and in doing so supports the key objectives of Australian transport legislation at minimal cost and with limited government certification and regulation of service providers. Drawing on the implementation of the EWD model, the best practice model should:

- describe the roles and responsibilities of government agencies, police, service providers and heavy vehicle operators
- set expectations as to what regulatory telematics should address, including in relation to:
    - electronic recording devices
    - communications
    - physical and cyber-security
    - back-office systems, and
    - data storage, sharing and destruction.

- update and apply the *Compliance and Enforcement Framework for Heavy Vehicle Telematics'* data dictionary that standardises the terminology and format of data inputs that can be used by industry in minimum standards
- update and apply the *Compliance and Enforcement Framework for Heavy Vehicle Telematics'* evaluation tool that sets out in what circumstances government certification of regulatory telematics is appropriate, and
- identify low-cost options and measurable benefits for industry.

Lead agency: the NTC.

Timeframe: submit to Council by November 2019.

Two models to support regulatory telematics should be further assessed

In Australia two different approaches are in use or being developed to support the use of telematics data for regulatory purposes: the IAP model, based on TCA certification, and the EWD model, based on the NHVR setting minimum technical standards but allowing the market to innovate and develop telematics solutions with an increased focus on transport operators rather than service providers. These models provide different benefits and disadvantages. The IAP model seeks to regulate service providers and in doing so increase certainty and confidence for government agencies that electronic records are accurate and can be relied upon for prosecution. The EWD model focuses on regulating heavy vehicle operators rather than service providers. The NHVR sets minimum technical standards that operators are responsible for meeting. The EWD approach is less controlled but is expected to facilitate innovation, be more cost effective and help promote increased voluntary take up by heavy vehicle operators.

These models represent very different approaches on how best to use telematics data to support government's desired regulatory objectives. There is clearly a need to balance evidentiary certainty with cost and innovation. Furthermore, there needs to be benefits for industry in return for using regulatory telematics, otherwise the uptake of the technology will remain marginal, and the community will not benefit from improved safety, productivity and environmental outcomes, as well as regulatory efficiencies.

However, based on stakeholder feedback, two models are creating market uncertainty. It is not sustainable to have two parallel models for regulatory telematics, and our vision for the future is the development of one legislated model that is flexible, technology- and application-neutral and can accommodate higher levels of assurance if necessary.

Recommendation

Recommendation 6: That, as part of the review of the HVNL, the NTC, in consultation with the NHVR, road transport agencies, the road transport industry, TCA and technology providers, assesses whether the co-designed Best Practice Model for Regulatory Telematics should be legislated and replace existing regulatory telematics models. The assessment should be subject to public consultation, cost benefit analysis and appraisal of whether the EWD and IAP models are fit for purpose. This should include assessment of whether the EWD model has provided the NHVR with sufficiently accurate records for regulatory purposes.

In addition, the review of the HVNL should explore the provision of real-time non-conformance reports to the relevant operator, and the provision of de-identified aggregated IAP information to road transport agencies for investment, network management and traffic management purposes.

Lead agency: the NTC.

Timeframe: the review of the HVNL is planned to commence in FY 2019–2020.

5 Review of governance arrangements

Key points

- Governments contribute a total of $2 million to $2.8 million each year to fund the IAP. There are additional resource costs associated with managing non-conformance reports and undertaking compliance and enforcement activities: road transport agencies are employing around 15 FTEs in total to manage the IAP.
- Governance arrangements for IAP and TCA are generally working well. There is an opportunity to improve the oversight of TCA by ensuring seniority and consistent attendance of board members.
- EWD policies and standards set by the NHVR would benefit from greater oversight by TISOC and the Council. This would align with expectations in the HVNL that ministerial guidelines are established and would increase accountability and confidence in the NHVR's delivery of EWDs.

The terms of reference tasks the review to assess current governance structures, and to assess whether the arrangements governing regulatory telematics use remain appropriate. This chapter focuses on governance models related to the IAP and EWDs.

5.1 Governance of IAP

The current governance model for the IAP is legislated in chapter 7 of the HVNL. There are four distinct IAP roles: TCA, auditors, service providers and operators.

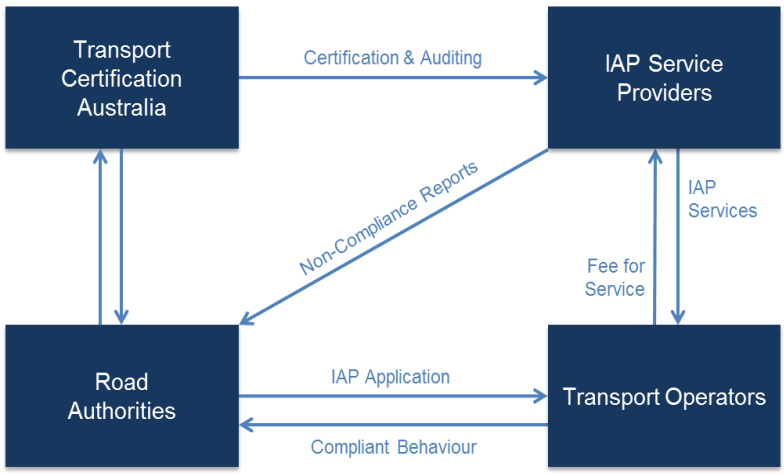
- TCA's functions include the following:[92]
    - approve and cancel IAP approvals, and manage certification and audits
    - collect, hold and protect intelligent access information
    - prepare documentation and inform individuals of personal information held
    - provide individuals with access to personal information and disclose information to the NHVR, auditor, operator or individual if it is relevant
    - retain noncompliance reports and destroy intelligent access information or remove personal information from it, and
    - report tampering or suspected tampering of system.
- Auditors' functions include the following:[93]
    - collect, hold and protect intelligent access information
    - provide individuals with access to personal information
    - disclose information and report findings for auditing purposes to the NHVR, TCA, operator or individual if it is relevant to their functions
    - manage records of use or disclosure of intelligent access information, and
    - report contraventions by service providers to TCA and tampering or suspected tampering of a system.

[92] Sections 425, 427-430, 433 and 436-438 of the *Heavy Vehicle National Law 2012* (QLD).
[93] Sections 440-442, 447 and 449-452 of the *Heavy Vehicle National Law 2012* (QLD).

- Service providers' functions include the following:[94]
    - collect, hold and protect intelligent access information
    - provide individuals with access to personal information as soon as practicable and without cost
    - provide auditors with access to records
    - disclose compliance information and report contraventions to the NHVR
    - retain noncompliance reports and destroy intelligent access information, and
    - report tampering or suspected tampering of system.
- Operators' functions include the following:[95]
    - must not give false or misleading information to service provider
    - advise driver of collection of information by service provider and of obligations about reporting system malfunctions, and
    - report system malfunctions to the NHVR.

The IAP model mirrors TARV ISO 15638 (Figure 6). TCA is the independent approval authority. TCA manages the national administration of the IAP and the certification and audit of the IAP service providers on behalf of the NHVR and road transport agencies. The road transport agencies remain responsible for setting policy and for determining the circumstances in which the IAP should be applied as a condition of access.

Figure 6. IAP governance model



TCA is a public company limited by guarantee established under the *Corporations Act 2001* (Cth). TCA's funding model is outlined in a memorandum of understanding (MoU) between TCA and its members, who consist of the Commonwealth and road transport agencies. TCA is dependent on its members for the majority of its revenue.

Table 3 sets out member contributions made to TCA to fund the Triple A model in 2016, 2017 and 2018 (these costs are not exclusively related to the IAP).[96] TCA advised member contributions have continued to decrease each year.

[94] Sections 409-411, 413-414, 417-418, 420-422 and 424 of the *Heavy Vehicle National Law 2012* (QLD).
[95] Sections 404-407 of the *Heavy Vehicle National Law 2012* (QLD).
[96] The Triple A model includes undertaking public purpose initiatives related to the provision of technical advice, accreditation and administrative services for government.

Table 3. TCA member contributions 2016 to 2018[97]

Revenue	2016-17	2017-18
Advisory services to members (not IAP) Note: This relates to the provision of advisory services to Members in relation to telematics and related intelligent technologies	$656,882	$695,445
National Telematics Framework administration (not IAP) Note: This is for administration of the national platform which enables an open technology market through the National Telematics Framework	$638,518	$667,718
Road manager services (for IAP) Note: These costs only apply to operational jurisdictions (not the Commonwealth)	$606,141	$567,560
Road manager services for use of Telematics Analytics Platform (for all regulatory telematics applications) (not IAP) Note: These relates to Members' use of a reporting and analysis tool for telematics data	$40,456	$64,608
Interim OBM Solution (not IAP)	$180,262	$0
TOTAL	**$2,122,259**	**$1,995,331**

TCA is governed by a Board of Directors, comprising officials from each Member agency, and an independent Chair appointed by the Board. The Board has responsibility for providing strategic direction to TCA management, approving the annual work program and budget, and overseeing TCA's performance against its Strategic Plan and Business Plan.

TCA's primary function is to meet its Constitution and MoU, as well as its obligations in the HVNL and to provide assurance to road transport agencies that telematics used for a regulatory purpose will meet minimum expectations of evidentiary value, accuracy and reliability.

TCA also undertakes public purpose initiatives related to the provision of technical advice, accreditation and administrative services for government.

Finding

- Governments contribute a total of $1.9 million to $2.1 million each year to fund TCA's Triple A model (these costs are not exclusively related to the IAP). There are additional resource costs associated with managing non-conformance reports and undertaking compliance and enforcement activities: road transport agencies are employing around 15 FTEs in total to manage the IAP. The upfront and ongoing costs associated with the EWD model are yet to be determined.

5.2 Stakeholder views on IAP governance

Government stakeholders that enagage with TCA are generally satisfied with the current governance arrangements for IAP and TCA. Some observations were made, however, that in the current arrangements TCA does not directly report back to TISOC, and TISOC does not have direct line-of-sight of TCA's direction and activities. For example, it was noted by one government agency that the TCA board has alternate members. Attendance

[97] 2016-17 was the first year TCA's 'Triple A' cost allocation model was implemented. As such, there are no comparable figures for previous financial years.

rates are mixed and lower-level officers are sometimes delegated to attend. This is perceived by some government officials to impact the effectiveness of TCA's Board. Government officials also raised concerns that TCA's expansion into other areas (such as taxis and alcohol interlocks) may have resulted in a less focused delivery of core IAP services. This was compounded by the perception that member contributions to IAP may be cross-subsidising other activities undertaken by TCA, such as the development of the *National Telematics Framework*. TCA have advised that the Triple A cost allocation model was developed to prevent the possibility of cross-subsidisation.

Industry stakeholders that enagage with TCA, particularly IAP-accredited service providers, are generally satisfied with the current governance arrangements for IAP and TCA. In particular, IAP has a clear funding model and clearly-defined legislated separation of roles and responsibilities between TCA, road transport agencies, auditors and service providers.

Industry stakeholders that do not engage with TCA were more critical of current governance arrangements. A number of associations and non-IAP service providers commented that current arrangements are confusing and TCA's function could be transferred to another agency such as the NHVR. In their view, transferring these functions would reduce costs and duplication. TCA has indicated a number of these views are based on misunderstandings or incorrect perceptions of TCA's governance and funding structure.

Finding

- Current governance arrangements for IAP and TCA are generally working well. There is an opportunity to improve the oversight of TCA by ensuring seniority and consistent attendance of board members.

5.3 Governance of EWDs

A governance structure for the regulation of the EWD is developing. The NHVR has a legislated responsibility for the approval of electronic recording systems (the EWD) in chapter 6 of the HVNL. The HVNL does not legislate any roles in relation to auditing, service providers or record keepers.

The NHVR is Australia's independent regulator for all vehicles over 4.5 tonnes gross vehicle mass. The NHVR was established as an independent statutory authority pursuant to the HVNL. The NHVR reports directly to responsible Ministers and is overseen by the NHVR Board, established under section 662 of the HVNL. The Board's functions include deciding the NHVR's policies and ensuring the NHVR exercises its functions in a proper, effective and efficient way. The Board consists of five members appointed by the Queensland Minister on the unanimous recommendation of responsible Ministers. The current NHVR Board comprises members with experience working for road transport agencies and industry groups and associations.

The HVNL allows for ministers to approve guidelines in relation to the granting of EWD approvals. Ministerial guidelines have not been developed, and the NHVR has progressed the EWD Policy Framework and Standards in consultation with stakeholders but without regard to ministerial guidelines. The NHVR has stated the EWD Policy Framework and Standards will not be approved by ministers as it is an administrative policy framework, not ministerial guidelines. The NHVR intends that the EWD Policy Framework and Standards will be approved by the NHVR board.

5.4 Stakeholder views on EWD governance

Industry stakeholders are generally satisfied with EWD governance arrangements and the roles and responsibilities of the NHVR. IAP service providers are the only industry stakeholder group that suggested there should be greater oversight of the NHVR's approval process and a potential certification role for TCA.

Government stakeholders broadly support the governance arrangements for EWDs and the role of the NHVR. They recognise that the NHVR has a legislated responsibility to approve electronic recording systems, and it is the NHVR's responsibility to implement the EWD.

One industry stakeholder noted the importance of the EWD Policy Framework and Standard being consistent with or incorporated within the *National Telematics Framework*. The stakeholder commented that this would mean the EWD Policy Framework and Standard would be consistent with the data dictionary and Telematics In-Vehicle Unit (IVU) Specification, ensuring operators with IVU approved devices would be able to use one device for many telematics applications. The NHVR confirmed the elements of vehicle ID, date/time, location and driver records from the data dictionary have been used in the EWD Policy Framework and Standards. The NHVR advised that the *National Telematics Framework* and Telematics In-Vehicle Unit (IVU) Specification have not been used in the development of the EWD Policy Framework and Standards, as the EWD is not required to be tethered in the vehicle. However, the NHVR also advised that operators using TCA approved IAP devices should be able to use the same device for their EWD, subject to meeting the EWD Policy Framework and Standard.

However, to improve transparency and accountability, some government stakeholders observed that there could be greater ministerial oversight of EWD policy and standards. This would be consistent with sections 343(3) and 653 of the HVNL that sets out that the NHVR needs to take into consideration ministerial guidelines when approving an electronic recording system (if ministerial guidelines are developed); and this would be consistent with the Council's 2014 direction outlined in the NTC's EWD policy paper.

In 2014, the Council approved the NTC's EWD policy paper, which was based on policy analysis and public consultation with government and industry stakeholders. Recommendation 10 provided that:

> *the EWD technical specification, and any substantial changes, are approved by the Transport and Infrastructure Council, with minor and non-contentious amendments approved by TISOC; and that a public version of the EWD technical specification is made available on the National Heavy Vehicle Regulator website*.[98]

The policy rationale underpinning this recommendation was that ministerial approval of the EWD technical specification would increase transparency and accountability of the standards. The paper also outlined the importance of the technical standards reflecting the policy positions agreed by the Council and that a ministerial approval process is a proportionate and reasonable level of oversight to ensure that policy settings and the technical specification are aligned. Finally, the EWD policy paper recommended the EWD technical standard should be available in the public domain on the relevant agency website, to facilitate the development of integrated telematics applications for both commercial and compliance related purposes.

In addition to the feedback outlined above, one road transport agency suggested that the HVNL be amended to clarify who owns the IAP and EWD, i.e. whether they are owned by the NHVR, TCA or road transport agencies.

[98] National Transport Commission, 2014, *Electronic Work Diaries*, Final Policy Paper, p. viii, https://www.ntc.gov.au/Media/Reports/(09E15645-A37B-745E-F9C5-D01BFFE782AB).pdf.

Finding

- The HVNL references ministerial guidelines in relation to the approval of EWDs. In the future, EWD policies and standards set by the NHVR would benefit from ministerial guidelines. This would increase accountability and confidence in the NHVR's delivery of EWDs.

6 Regulatory telematics strategies

Key points

- The *2011 strategy* identifies the wider benefits of regulatory telematics for industry, government and the community; assesses strategic options to increase the use of regulatory telematics, and establishes national policy principles to guide government policy.
- The objective of the *C&E Framework* is to provide certainty in national policy on the use of telematics data to improve compliance and enforcement in the heavy vehicle industry.
- The *National Policy Framework* outlines an agreed national approach to policy, regulatory and investment decision-making for technologies in the land transport sector.

There are several government strategies that relate to telematics used for regulatory purposes. These include:

1. The *National In-Vehicle Telematics Strategy* (2011 strategy). The *2011 strategy* was approved by the Council in 2011 and identifies opportunities for regulatory telematics. The *2011 strategy* provides that governments can address supply chain market failures and enable regulatory policies by encouraging the uptake of telematics. The *2011 strategy* identifies when governments should partner with businesses to improve telematics use, and when the mandatory use of telematics may be warranted.
2. The *Compliance and Enforcement Framework for Heavy Vehicle Telematics* (C&E Framework). The *C&E Framework* was approved by the Council in 2014. The goal of the *C&E Framework* is to encourage the widespread use of in-vehicle telematics, supported by responsive management and reporting systems. The *C&E Framework* seeks to support self-regulation within industry and allow more targeted enforcement of high-risk operators. The *C&E Framework* states that the level of government oversight of a telematics device will depend on a number of factors, including whether the telematics information is to be used for roadside enforcement or to support audit-based compliance activities.
3. The *National Policy Framework for Land Transport Technology* (National Policy Framework). The *National Policy Framework* was approved by the Council in 2016 and underpins the role of government in relation to regulatory telematics and includes seven policy principles to inform a consistent approach to enabling new technologies.

6.1 National In-Vehicle Telematics Strategy

6.1.1 Opportunities

The *2011 strategy* identifies significant opportunities for industry, governments and the broader community. The review has sought views and undertaken an evaluation of how, seven years after the strategy was endorsed by governments, these opportunities are being realised.

Table 4 summarises the review's evaluation of the extent to which these opportunities have been realised. The observations are drawn from views expressed by interviewees and evaluation of current programs.

Table 4. Telematics opportunities for government: achievements 2011-2018

Opportunity identified in the 2011 Strategy	Has the opportunity been realised?	Observations
Improved road safety through effective compliance monitoring – e.g. speed or fatigue management	Limited	Road safety, including fatal crashes involving articulated trucks, has remained steady in the period 2012-2016, with 124 fatal crashes in 2012 and 95 in 2016.[99] We have seen limited uptake of speed compliance monitoring as a sub-component of the IAP (in Queensland only). Some fatigue management is being used in BFM and AFM, but it is operator-driven.
Better management and safer use of vulnerable infrastructure	Yes	The IAP is being used extensively in New South Wales and Queensland to protect vulnerable road assets and as a tool to manage the HML network. Victoria has undertaken a major bridge-strengthening program that has minimised the vulnerable infrastructure risks and the demand for the IAP.
Smart compliance tools to reward 'good operators' and identify non-compliant operators	Limited	Road transport agencies use telematics data, in the form of non-conformance reports, to identify non-compliant operators. Road transport agencies are not using telematics data to reward good operators.
Better management of the environment (for example, low emission zones near communities heavily exposed to truck movements)	No	Industry interviewees commented that the IAP allows for environmental gains; however this was not their key reason for enrolling in the IAP.
Better access to infrastructure and resource-use efficiency (for example, potential road pricing applications and higher axle weights)	Limited	Road transport agency interviewees stated the IAP provides industry with better access to roads and infrastructure.

To the extent that these opportunities continue to be relevant and sought after by governments, the assessment indicates that there has been a significant period of lost opportunity to harness technology and to achieve improved policy outcomes.

[99] Bureau of Infrastructure, Transport and Regional Economics data indicates there were a total of 124 fatal crashes involving articulated trucks in Australia in 2012, 90 fatal crashes in 2013, 101 fatal crashes in 2014, 101 fatal crashes in 2015 and 95 fatal crashes in 2016; Department of Infrastructure and Regional Development, 2017, *Fatal heavy vehicle crashes Australia quarterly bulletin*, p. 2, https://bitre.gov.au/publications/ongoing/fhvc/files/Bulletin_Jun_2017.pdf.

6.1.2 Threats

The *2011 strategy* identified a number of threats for industry and government. The review has sought views and undertaken an evaluation of whether, in the seven years since the strategy was endorsed by governments, these threats have eventuated.

Table 5 summarises the review's evaluation.

Table 5. Telematics threats to industry and government: evaluation 2011-2018

Threat identified in the 2011 Strategy	Has the threat eventuated?	Observations
A lack of policy certainty could constrain industry investment in in-vehicle telematics	Partially	Industry and service provider interviewees commented policy uncertainty is high and is impacting decisions to invest in the IAP. Some technology providers are not investing in the development of EWDs while the operating model and specification is in development.
There are potential financial impacts on business, particularly if telematics use is mandated	Partially	The IAP is not voluntary for a range of applications, particularly in Victoria and Queensland (notably over-dimensional and over-mass cranes); and for operators seeking HML network access.
Significant 'sunk' financial investments in technology may not be recognised by government policy	Partially	Industry and service provider interviewees advised they have ceased investment in costly telematics solutions until there is certainty around government policy.
Multiple 'black boxes' could be required in vehicles	Partially	Industry interviewees stated they use multiple black boxes to perform different tasks for regulatory and commercial purposes.
Fragmented state-driven policy responses may create regulatory burdens	Partially	Governments all use the IAP, which has a standardised platform and specifications; but states and territories use the IAP for different applications, depending on policy direction and infrastructure needs.
Prescriptive standards may limit the market and innovation over-time	Partially	Industry interviewees advised innovation is currently restricted due to current legislative arrangements and the cost of service providers having the device certified or type-approved.
Industry is not well-informed about options and benefits of technology	Partially	Interviewees advised that industry is well informed as the landscape has not changed significantly after 10 years. Interviewees stated transport operators are highly receptive to business efficiencies, and the decision not to invest in IAP is often because the business case to invest in IAP is not sufficient, rather than because of misinformation about IAP or being uninformed about the opportunities of IAP.

There may be inappropriate enforcement and privacy issues	No	The IAP has legislated privacy protections that limit the use of IAP information for other purposes (EWD laws have similar protections).

The assessment indicates that government policies in relation to regulatory telematics have experienced some challenges, particularly in relation to a lack of policy certainty and state-driven policy responses that have constrained industry investment. Other threats, such as market information about the benefits and opportunities of regulatory telematics, may not necessarily be the responsibility of government.

6.1.3 Proposed options

The *2011 strategy* identified three possible options to meet the objective of increased uptake of in-vehicle telematics. The strategic options ranged from business as usual, a partnership approach and a strong interventionist approach by governments.

The *2011 strategy* found that the partnership approach outlined in option 2 (described below) 'is to be adopted as it best achieves the identified policy principles.'[100]

The review has assessed the current use of regulatory telematics against each of the strategic options outlined in the *2011 strategy*. The review found that there has not been one strategic option consistently adopted and implemented. Indeed, there are elements of all three strategic approaches in telematics-related policies and programs in existence today.

Option 1 – Business as Usual

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, and
- do not engage actively with industry and provide clarity about existing standards and requirements.

The review found that non-intervention has been the most common response from governments. For example, there has been limited government involvement in encouraging heavy vehicle operators to use telematics to manage speed compliance, whether through IAP or less formalised arrangements.

Governments have generally not been strategic about identifying and pursuing opportunities to integrate additional applications into the IAP, or to incentivise or promote the benefits of specific regulatory applications.

Several interviewees, particularly from the technology services industry, commented that there has not been a clear roadmap that outlines what regulatory telematics applications governments intend to certify, promote, incentivise or mandate. Recent high-level strategies have not outlined a cogent vision about the direction of regulatory telematics and how – if at all – regulation and enforcement will adapt to emerging technologies. This has reduced innovation related to regulatory telematics and slowed market uptake.

[100] National Transport Commission, 2011, *National in-vehicle telematics strategy: the road freight sector*, Policy Paper, p. 12, https://www.ntc.gov.au/Media/Reports/(5CD00DF0-8418-8BBA-DC53-63774FAA0E85).pdf.

Option 2 – Government and industry partnership

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, and
- 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, and
- 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.

A government and industry partnership approach has been adopted in a number of areas. AFM, for example, encourages industry to manage driver fatigue by using fatigue management systems, including the use of electronic recording of work and rest hours. We are also seeing the emergence of more partnerships between industry associations and the NHVR, with the development and NHVR endorsement of industry codes related to meeting chain of responsibility obligations.

Industry interviewees observed that there has been significant flux in relation to the development of EWD policies and standards, and this has made it difficult to invest in research and development of electronic recording systems because it is uncertain what technical, operational or evidentiary requirements governments will place on industry.

Likewise, IAP service providers commented that while there has been an increase in the number of IAP applications over time, this growth has been piecemeal and not based on a publicly-stated and clearly defined strategic plan or vision. Again, this has slowed investment in telematics research and development, but also created uncertainty for heavy vehicle operators when evaluating the costs and benefits of investing in the IAP.

These problems are amplified by having different policy settings for the IAP in each state and territory.

Option 3 – Government intervention

Governments move to mandate 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.

Governments have not mandated the comprehensive use of telematics for compliance and enforcement purposes. Governments have not intervened in the market to specify technology solutions (such as we have seen with the European Commission adopting a single digital tachograph to be integrated in all heavy vehicles), and industry has had the flexibility to introduce telematics to meet their chain of responsibility and Work Health Safety obligations.

6.2 Compliance and Enforcement Framework for Heavy Vehicle Telematics

The *C&E Framework* identified that telematics technologies may contain personal information, and – when location information is collected – potentially sensitive information that is comparable to a surveillance device. For this reason, the *C&E Framework* principles provide governments with clear rules about access and use of data generated by telematics. These principles are consistent with Human Rights obligations and the Australian Privacy Principles, and provide that government agencies must be clear about the intended uses of telematics data; and data collection or access should support reasonable and proportionate enforcement activities.

Principle 8 was a key focus of the review. Principle 8 provides that:

> *The performance standard of telematics used for regulatory purposes is a policy decision to be guided by the objectives of the regulatory application under consideration. Where possible, standards should support interoperability and facilitate multiple commercial and regulatory applications. Telematics used for enforcement must meet evidentiary requirements.*[101]

Principle 8 recognises that telematics devices and systems are tools that can be used for different purposes to meet any number of policy outcomes. The decision to use regulatory telematics is therefore a policy decision as well as a technical decision about standards and specifications.

Principle 8 highlights the challenge the review has identified in both the IAP and the EWD – that is, how governments can support innovation and industry uptake of technology that has significant potential benefits (driven largely by cost), balanced with ensuring the information generated by telematics can be trusted and relied upon for regulatory purposes.

6.2.1 Data dictionary

A data dictionary is agreed terminology which, consistently applied to telematics devices and systems, enables greater interoperability through the definition of:

- communication protocols (e.g. common language)
- data set forms (e.g. common set of words)
- meaning and interpretation (e.g. common word definitions), and
- accessibility and use (e.g. common approach to the access and use of data and information).

The data dictionary for telematics enables regulatory applications to be consistent with international standards (primarily ISO 15638) and to be interoperable with other systems. TCA developed the data dictionary in consultation with industry and government and the intention was that governments would use the data dictionary in the development of future standards or technical specifications for telematics.

[101] National Transport Commission, 2014, *Compliance and enforcement framework for heavy vehicle telematics*, Policy Framework, p. 8, https://www.ntc.gov.au/Media/Reports/(C5F39CEF-3F43-490C-8D2B-569185379C55).pdf.

The data dictionary is intended to be a living document that can be updated and enhanced over time.[102] It is publicly available on the TCA website,[103] and it mirrors the international standard ISO 15638 (Appendix D).[104]

The review has not identified industry or government actively applying the data dictionary to technical standards or specifications, but interviewees have commented that this has been because new standards or specifications overseen by government have not emerged since the data dictionary was established in 2014. The NHVR, which is currently overseeing the development of a technical specification for the EWD, has stated that it is integrating elements of the data dictionary and ISO 15638 in that specification.

6.2.2 When certification is necessary under the Compliance and Enforcement Framework

The *C&E Framework* established a method to determine when telematics devices or systems should be certified by governments (Table 6).

The *C&E Framework* examined why government certification, or an approval process, may be necessary on the grounds of ensuring the data generated by a telematics device is of sufficient evidentiary quality.

Today, fixed speed cameras and Safe-T-Cam technologies are used by enforcement agencies to issue infringements. The testing and calibration procedures for these technologies are prescribed, and agencies must ensure that the cameras are accurate and reliable. Emerging regulatory telematics, such as EWDs, can also be used as primary evidence to issue infringements – the difference being that the technology is inside the heavy vehicle and controlled by the operator and not fixed at the roadside. Agencies are not able to control the hardware and software in the same way as a fixed speed camera or Safe-T-Cam. This requires a balance. Governments seek to encourage industry to innovate and integrate commercial and regulatory systems – but they also need the data produced by these systems to be sufficiently accurate and reliable in a court of law.

The principle underlying the approach is that the level of assurance governments require of a telematics system, including the performance, integrity and tamper-evident capabilities of that system, depends on the extent to which the regulatory application is used for enforcement purposes.

The *C&E Framework* established three categories:

1. Will the data be used by regulators and enforcement agencies to enforce the law? If so, governments should seek a high level of assurance. A high level of assurance would require a government certification or approvals process.
2. Will the data be used by industry to demonstrate legal compliance? If so, governments should seek a medium level of assurance. A medium level of assurance could require common standards to be adopted with increased penalties for non-conformance, increased system auditing, third-party record keeping or a reverse onus of proof.
3. Will the data only be used by industry to generally increase compliance levels? If so, the level of assurance is a matter for industry.

[102] National Transport Commission, 2014, *Compliance and enforcement framework for heavy vehicle telematics*, Policy Framework, p. 13, https://www.ntc.gov.au/Media/Reports/(C5F39CEF-3F43-490C-8D2B-569185379C55).pdf.
[103] Transport Certification Australia, 2014, *Telematics Data Dictionary*, https://tca.gov.au/ntf/tdd.
[104] Elements of the data dictionary are set out on the TCA website at: https://tca.gov.au/ntf/tdd/iso-applications.

Table 6. Method to determine whether a system needs to be certified or approved by government

Compliance approach	Will regulators and police use telematics to enforce the law?	Will industry use telematics to demonstrate compliance?	Will industry use telematics to generally increase compliance?
Roadside enforcement	**YES**	**NO**	**NO**
Supervisory intervention order	**YES**	**NO**	**NO**
Audit-based compliance	**DEPENDENT**[105]	**YES**	**YES**
Safety management system	**NO**	**YES**	**YES**
Chain of responsibility	**NO**	**YES**	**YES**
Meta-regulation	**NO**	**NO**	**YES**
	If YES, a high level of assurance is required	**If YES, a medium level of assurance is required**	**If YES, level of assurance is a matter for industry**

The methodology does not prevent enforcement agencies from accessing telematics installed for other purposes (such as chain of responsibility), but if agencies do so, the high level of assurance should not be expected.

The methodology and minimum standards for regulatory telematics do not necessarily preclude operators from using their own systems for regulatory purposes, including for purposes that require a high level of assurance (subject to the necessary certification or approval process).

The methodology assumes that operators will use telematics to demonstrate compliance with chain of responsibility, and that chain of responsibility will continue to rely on audits and investigations rather than focus on roadside enforcement. If road transport agencies were to rely on road side enforcement to regulate chain of responsibility, then telematics used for chain of responsibility would require a higher level of government assurance.

6.2.3 Assessment of the current state against the Compliance and Enforcement Framework

Intelligent Access Program

The IAP is underpinned by government certification. Therefore, based on the *C&E Framework* methodology, the IAP should require a high-level of assurance because it is based on roadside enforcement or a supervisory intervention order. Leaving supervisory intervention orders to one side, the review has identified that the IAP is a hybrid compliance and enforcement approach that does not exactly fit the methodology. On the one hand, the IAP is not used for roadside enforcement purposes, but on the other hand

[105] Level of assurance is dependent on extent to which audit-based schemes are subject to roadside enforcement.

the data it generates is intended to be used as evidence in prosecutions and is intended to be highly accurate and fit-for-purpose.

Government interviewees have confirmed that IAP data has been used as evidence in 15 crane-related prosecutions related to IAP access breaches. In real terms, IAP non-conformance reports are being used by road agencies and the NHVR to undertake operator visits to increase compliance rates, and to provide intelligence to undertake audit-based activities or investigations. If this approach continues, the rationale for governments to certify the accuracy of the IAP diminishes. This is further exacerbated by the current practice of regulators to use the IAP information to commence subsequent investigations – it is those subsequent investigations that obtain the evidence to establish a credible prosecution with a reasonable expectation of success, not necessarily the IAP data itself.

Unless IAP non-conformance reports are to be used for roadside enforcement, or to prosecute operators without any broader investigation or audit to identify non-conformance, based on the *C&E Framework* methodology a medium level of assurance should be required by governments.

Electronic Work Diaries

Chapter 6 of the HVNL provides that the NHVR must approve an electronic recording system for use, such as an EWD. The HVNL requires the NHVR to consider a number of factors when deciding an application for approval, such as suitability for the device to be fitted to a heavy vehicle and capability of accurately monitoring and recording work and rest times.[106] However, unlike the IAP, there is no requirement in the HVNL for the NHVR, or any other government agency, to certify that the electronic recording system meets agreed minimum standards or a technical specification.

In December 2017, the NHVR released a draft EWD Policy Framework and Standards for public consultation. Interviews with the NHVR indicate that the preferred model is a co-regulatory approach that allows operators to use third party (or their own) electronic recording system, as long as they meet minimum standards. Based on this approach, an EWD may be approved by a government agency, but it would not be necessary to do so. Correspondingly, the NHVR does not intend to develop compliance assessment software or a centralised data interface to support roadside enforcement of EWDs.

The review has found that the extent to which the NHVR's approach is consistent with the *C&E Framework* methodology depends upon whether regulators and enforcement agencies access the EWD during roadside enforcement activities, and issue infringement notices based on the information generated by the EWD. If the EWD technology is harnessed to support a greater emphasis on chain of responsibility obligations, back-office audits and intelligent risk profiling – and roadside enforcement of EWD records is minimal – then the medium level of assurance preferred by the NHVR would be warranted. However, if the EWD is used as a core component of roadside enforcement activities, then a high level of assurance would be warranted.

The *C&E Framework* methodology describes a government approvals process as a high level of assurance – but whether the EWD approvals process will result in a high level of assurance will depend upon the detail of the approvals process proposed and implemented by the NHVR.

[106] *Heavy Vehicle National Law 2012*, section 343.

6.3 National Policy Framework for Land Transport Technology

The *National Policy Framework* establishes four main roles for government to deploy transport technology: policy leadership, enabling, a supportive regulatory environment and investment. The review focused on two aspects of the role of government because of their relevance to regulatory telematics:

- Policy leadership: provide a clear, nationally coordinated approach across different levels of government, being responsive to changes in the technological environment, and
- Supportive regulatory environment: wherever possible, provide certainty about future regulatory requirements.

The *National Policy Framework* recognises that the deployment of new transport technologies creates operational and policy challenges for governments. Regulation needs to eliminate unnecessary barriers to deployment, encourage innovation and support technology uptake.

This statement on the role of government by the Council speaks to a key issue underlying the use of technology for regulatory purposes: on the one hand, governments seek to support new technologies and not over-regulate, and on the other hand seek to ensure appropriate levels of safety, security and privacy are maintained. The role of government outlined in the *National Policy Framework* is reflected in principles 6 and 7.

> **Principle 6:** When considering regulatory action, governments will consider low cost approaches such as collaborative agreements or self-regulation before pursuing formal regulation.
>
> **Principle 7:** If required, best practice regulatory approaches will be adopted to ensure regulation is cost efficient, transparent, proportionate to the risk, fit for purpose and done in consultation with affected stakeholders. This includes adopting relevant international or regional standards, unless there is a compelling reason for a unique Australian requirement.

Principle 6 of the *National Policy Framework* supports the NHVR's proposed EWD model, as it promotes a co-regulatory approach. The NHVR has adopted a model that does not require government certification. This remains consistent with the EWD provisions in the HVNL (which only requires the NHVR to approve an electronic recording system, with no requirement for third-party certification).

Findings

- The strategic directions and policy principles set out in the *National Policy Framework for Land Transport Technology* (2016) and the *National In-Vehicle Telematics Strategy* (2011) provide a benchmark from which government and industry can develop a Best Practice Model for Regulatory Telematics (see recommendation 5). Many of the threats identified in the 2011 telematics strategy, such as a lack of policy certainty, have partially eventuated.
- The *Compliance and Enforcement Framework for Heavy Vehicle Telematics* (2014) provides a data dictionary to support peer-to-peer communication and practical guidance about when government assurance of telematics is appropriate. This could be used more by governments, and could be updated or replaced by the Best Practice Model for Regulatory Telematics (see recommendation 5).