National Transport Commission

Delivering a Compliance Framework for Heavy Vehicle Telematics

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**Report outline**

| Title: | Delivering a Compliance Framework for Heavy Vehicle Telematics: Final policy paper |
| Type of report: | Final policy paper |
| Purpose: | For publication |
| Abstract: | The paper proposes a framework to facilitate the uptake of telematics by providing a nationally consistent treatment of telematics information for compliance and enforcement purposes and by establishing framework principles in relation to privacy, compliance and enforcement and evidentiary value. The paper recommends that a common dataset, based on relevant international standards, is adopted to enable telematics systems to be used for both commercial and compliance purposes. It also recommends that the framework provides a resource for governments and industry to improve responsive regulation, traditional enforcement, audit-based schemes, safety management systems, chain of responsibility and industry schemes through the uptake of heavy vehicle telematics. |
| Key milestones: | Endorsed by the Transport and Infrastructure Senior Officials’ Committee – April 2014; endorsed by the Transport and Infrastructure Council – May 2014. |
| Key words: | compliance and enforcement; heavy vehicle; telematics; ISO standards; TARV; responsive regulation; audit-based compliance; chain of responsibility; safety management system; accreditation; privacy; equity of treatment |
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Foreword

The National Transport Commission (NTC) is an independent body established under legislation and an intergovernmental agreement to provide independent advice to transport ministers on regulatory and operational reforms. The NTC undertakes these reforms across road, rail and intermodal transport to improve safety, productivity and environmental outcomes.

Australian road freight and bus industries are already using in-vehicle telematics technologies to improve their safety, efficiency and business processes. Harnessing the potential of this technology to further improve road safety compliance and reduce unnecessary red tape is a tremendous opportunity for operators and the broader community.

The development of telematics systems that can be used for compliance purposes, such as electronic work diaries and on-board mass monitoring, raises important questions about when governments should access this information to enforce the law and how to treat small breaches. This paper suggests a way forward, recognising that there are opportunities to improve roadside enforcement, audit-based schemes, chain of responsibility and industry schemes with the adoption of telematics.

Consultation has been undertaken between the NTC and Australian governments and regulators, industry peak bodies, telematics service providers and police representatives to produce this paper, and I acknowledge their commitment to road safety and regulatory reform. The contribution of Mr Peter Girgis and Transport Certification Australia (TCA) to develop a common dataset is also gratefully acknowledged.

David Anderson PSM
Chairman
Executive summary

The purpose of this final policy paper is to agree on recommendations for implementing a compliance framework for heavy vehicle telematics. The objective of the proposed framework is to provide certainty in national policy on the use of telematics data for compliance purposes, in order to encourage industry to adopt telematics and hence provide for improved road safety, productivity and environmental outcomes that ultimately contribute to higher standards of living.

Telematics is the term used to describe an in-vehicle device that forms part of a system that captures and sends information electronically. 1 Telematics can be used for commercial purposes (e.g. measuring how the vehicle is driven and engine performance) and regulatory purposes (e.g. the electronic work diary (EWD) to record work and rest hours).

Encouraging industry to adopt telematics has the potential to improve road safety, productivity and environmental outcomes that contribute to higher standards of living. Regulatory telematics should help achieve key road transport compliance for speed, fatigue and loading. Integrated in-vehicle telematics systems will encourage industry uptake.

Progress to date

In 2012 the Transport and Infrastructure Senior Officials’ Committee (TISOC) agreed that the National Transport Commission (NTC), as part of its annual work plan to ministers for 2013–14, would lead work to develop a compliance framework for heavy vehicle telematics.

The NTC has worked with industry, Australian governments, Transport Certification Australia (TCA) and the National Heavy Vehicle Regulator (NHVR) to scope and direct the project, identifying the barriers to uptake of regulatory telematics and developing the framework principles and common dataset.

In December 2013 the NTC released Developing a Compliance Framework for Heavy Vehicle Telematics: Discussion paper for consultation:

- First, the paper proposed framework principles, including a methodology to determine the level of assurance required by governments, of telematics systems.
- Second, the paper developed a draft common dataset to facilitate integrated and standardised telematics data that can be used for both commercial- and compliance-related purposes. The common dataset will initially capture: work and rest hours; mass and speed monitoring; vehicle location monitoring; and consignment location monitoring. These parameters can support a range of applications, including access and pricing.
- Third, the paper examined how telematics could be a tool to support responsive regulation, roadside enforcement, chain of responsibility, audit-based compliance, safety management systems and industry schemes.
- Finally, the paper proposed that mandatory and voluntary options for telematics are dependent on specific applications and policy proposals. Mandatory options are outside the scope of the framework.

Submissions were received from state and territory governments, police and industry. The need for, and direction of, the framework was supported, and a common dataset that facilitates open and interoperable standards was strongly endorsed. Many submissions welcomed an approach that recognises that the level of assurance required of telematics by governments is dependent on the purpose for which the telematics is used. The draft principles were refined through the consultation process, which is reflected in the framework principles proposed in this paper. A number of governments also sought to ensure the framework does not ‘close off’ mandatory options in the future, given the safety benefits attributable to regulatory telematics.

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1 National Transport Commission, Developing a Compliance Framework for Heavy Vehicle Telematics: Discussion paper, 2013, p. 5
Background

In 2011 the NTC released the National in-vehicle telematics strategy: the road freight sector, which recommended the development of an enforcement policy to support industry uptake of telematics. In 2012 the then Standing Council on Transport and Infrastructure approved the Policy Framework for Intelligent Transport Systems (ITS) in Australia to ensure that ITS use in each jurisdiction is compatible and that development occurs around a set of agreed compliance and enforcement policy principles.

Between 2011 and 2013 the feasibility of EWDs was tested in an operational pilot led by New South Wales. As part of that pilot, the NTC examined enforcement and policy aspects of EWDs. The pilot raised issues of how telematics could change the current compliance and enforcement paradigm, with the potential for smarter, risk-based enforcement, improved use of resources and a review of the balance between roadside and back-office enforcement. However, many stakeholders agreed that these questions went beyond fatigue and that a broader framework solution was needed.

Objectives

The objective of the framework is to provide certainty in national policy on the use of telematics data to improve compliance and enforcement. By increasing certainty and consistency in national policy, the framework is intended to encourage industry to adopt telematics and hence attain road safety, productivity and environmental benefits that ultimately contribute to higher standards of living.

The framework should support intelligent, risk-based enforcement and provide direction on the treatment of small breaches – a key issue given the increased accuracy and probability of detection of telematics – and the level of assurance governments need from regulatory telematics. A clear approach will increase industry confidence to invest. The aim is not to increase the regulatory burden for industry but to provide ways for industry to meet its compliance requirements more efficiently.

Vision of the framework

The realisation of safety, productivity and environmental benefits will be dependent on how industry and governments use telematics within compliance and enforcement strategies. A future where telematics is used as a tool to underpin compliance and enforcement is envisioned.

### Vision of the compliance framework for heavy vehicle telematics

Widespread use of in-vehicle telematics supported by responsive management and reporting systems has delivered better levels of regulatory compliance. This has led to increased accountability and self-regulation within industry and allowed more targeted enforcement of high-risk operators. Overall this has made a significant contribution to lowering crash rates among heavy vehicles, improving productivity and lowering their environmental impact.

Key elements of the proposed framework

1. Provide a resource for governments and industry to improve compliance and enforcement outcomes with telematics

The framework will provide a reference for regulators, enforcement agencies and operators to utilise telematics to improve compliance and enforcement through roadside enforcement, responsive regulation, audit-based schemes, safety management systems, chain of responsibility and industry-based schemes. It will recognise and explore the following benefits that will underpin improved road safety and productivity:

- Public authorities will have improved information to intelligently assess risks and to identify high-risk operators effectively and efficiently; this will provide regulators and enforcement agencies with opportunities to consider the balance of roadside enforcement and audit-based investigations.
- Operators can better measure their compliance and increase compliant behaviour.
• Operators and drivers can have certainty of compliance and can efficiently and effectively demonstrate high compliance, resulting in less enforcement exposure when it is appropriate to do so.
• Operators and drivers will have clear expectations of treatment from regulators and enforcement agencies.
• Businesses can harness telematics data to better manage and improve driver performance.
• Businesses can bundle commercial and regulatory applications in a single telematics system (with clear limitations on what data can be accessed by government).
• Businesses can integrate telematics into safety management systems to attain monitoring and management performance benefits; others can utilise telematics for audit-based accreditation.
• Operators and drivers who would otherwise gain a commercial advantage from noncompliance should have reduced opportunities to do so.

2. Maintain a common dataset

The framework will maintain a common dataset based on international standards. The common dataset will provide for standardised and interoperable telematics systems capable of facilitating both commercial and regulatory purposes. This will facilitate cost-effective integration and market innovation. While the common dataset will enable ‘bundling’ of commercial and compliance applications, a single integrated system may have multiple interfaces. This is a privacy-by-design mechanism to ensure enforcement agencies can only access telematics information necessary to undertake the regulatory task.

The discussion paper proposed a draft common dataset and data dictionary developed by TCA. The consultation process confirmed the direction of the common dataset and the initial applications of recording work and rest hours, mass and speed monitoring and vehicle and consignment location monitoring. Where possible, alternative standards can be integrated into the common dataset.

3. Establish framework principles

To ensure coordinated and nationally consistent deployment of regulatory telematics, and to ensure clear and robust privacy protections facilitate the uptake of telematics within an agreed policy framework, governments and regulators will implement heavy vehicle telematics initiatives, policies and programs in accordance with the following 10 framework principles.

**Principle 1** The access and use of telematics information must be consistent with Australia’s international human rights obligations: public authorities must not apply or enforce laws, policies or programs in a discriminatory or arbitrary manner, and no one must be subjected to arbitrary or unlawful interference with his or her privacy.

**Principle 2** When accessing telematics information for compliance and enforcement purposes, public authorities must be bound by privacy and information principles that are consistent with the Australian Privacy Principles – these principles should allow the aggregation of de-identified telematics data for research and planning purposes.

**Principle 3** Each regulatory application must clearly identify to the user which organisation has responsibility for personal information generated by the telematics system and which organisations may access or hold personal information derived from the telematics system.

**Principle 4** Information derived from telematics systems must only be accessed by public authorities for the regulatory purposes for which they were intended. For example, a telematics system installed only to meet regulatory requirements under the Heavy Vehicle National Law must not be accessed for any other regulatory, enforcement or investigatory purpose unless a court-issued warrant is obtained.

**Principle 5** Each regulatory application must set out:

• the purposes for which information will be collected
• which data will be accessed for these purposes
• the conditions under which this information will be sought.
**Principle 6**
Public authorities that use telematics information for a regulatory purpose must develop and implement policies based on reasonable and proportionate enforcement. The treatment of telematics information should have regard to patterns of behaviour and the higher probability of detection.

**Principle 7**
Enforcement policies in relation to the use of telematics information should be publicly released where it is appropriate to do so, and when the release of the enforcement policy does not pose a risk to the integrity of enforcement or regulatory policy.

**Principle 8**
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 compliance applications. Telematics used for enforcement must meet evidentiary requirements.

**Principle 9**
The use of telematics to improve compliance should aim, where possible, to ensure greater safety and efficiency for industry and public authorities.

**Principle 10**
These principles should be consistently applied to future regulatory telematics by participating public authorities. Public authorities should demonstrate and communicate to stakeholders why a departure from the framework principles is warranted.

The framework will support multiple applications, including fatigue, speed and mass regulatory requirements. The framework will support the flow of de-identified and aggregated information to support policy development, network planning and investment decisions. For example, network managers could be encouraged to provide accurate and real-time network information to telematics service providers.

**Recommendations**

**Recommendation 1:** that the framework be adopted to provide a reference for regulators, enforcement agencies and operators to facilitate better use of telematics to improve responsive regulation, audit-based schemes, safety management systems, chain of responsibility and industry-based schemes.

**Recommendation 2:** that the common dataset, including the data dictionary, is finalised by TCA in consultation with stakeholders and is subsequently approved by the Transport and Infrastructure Council for implementation as part of the compliance framework for heavy vehicle telematics.

**Recommendation 3:** that the minimum standards methodology be adopted as part of the compliance framework for heavy vehicle telematics and applied by governments when setting minimum standards for regulatory telematics.

**Recommendation 4:** that the regulators and enforcement agencies that access, handle and disclose personal information generated from regulatory telematics should adopt policies and practices consistent with the Australian Privacy Principles.

**Recommendation 5:** that regulatory telematics systems, and the institutional environment they operate in, should adopt a privacy-by-design approach to ensure regulatory and commercial systems co-exist; and that regulatory telematics systems only use personal information necessary to undertake the tasks directly related to the entity’s functions.

**Recommendation 6:** that the framework principles are approved by the Transport and Infrastructure Council and implemented as part of the compliance framework for heavy vehicle telematics.
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1. Introduction

1.1 What is telematics?

Telematics describes the capture of data within a vehicle and the subsequent use of that data both within the vehicle and remotely. Telematics systems typically comprise an in-vehicle device containing a series of sensors and inputs linked to a back-office system that captures, sends, stores and analyses information electronically. While the transport industry in Australia has adopted telematics in significant numbers over the last 10–15 years, telematics use has varied from simple vehicle location information to advanced diagnostics and safety systems. The technology, and importantly its use in transport businesses, continues to evolve. Hardware and software developers are innovative and fast-moving and as a result telematics technology has progressed from stand-alone single-use devices to interactive, intelligent and event-driven systems that increasingly form part of transport management systems that monitor, communicate, evaluate and respond to events, often in real time. 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. International standards are under development to ensure systems architecture and telematics applications are interoperable and minimum standards of security and integrity are identified.

Telematics is a tool that offers significant benefits when integrated as part of management systems. The technology can be used by industry for myriad different purposes – from collecting data (such as harsh braking and engine performance) for driver coaching, to improving maintenance programs through capturing tyre pressure, temperature and other key measures. These purposes can also include compliance with the law – notably Heavy Vehicle National Law (HVNL) obligations such as work and rest hour record keeping and mass and speed management obligations under chain of responsibility.

The emergence of telematics applications that facilitate the flow of information to enable transport operators and drivers to increase compliance has clear benefits for industry and the community. Table 1 provides an overview of the safety, productivity and environmental benefits of telematics for industry and the community. Telematics is a technology platform that can run a variety of applications. Different applications will be used by different operators depending on their fleet size, vehicle type, market and other factors. Benefits will consequently vary, depending on specific uses.

Table 1: The safety, productivity and environmental benefits of telematics

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<th>Benefits</th>
<th>For industry</th>
<th>For the community</th>
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<td>Safety</td>
<td>Delivers accurate and real-time information (such as work hours, speed and vehicle conditions) to operators and drivers, thereby providing the knowledge to manage high-risk activities. Safer drivers and safer vehicles.</td>
<td>Effective compliance monitoring leads to safer drivers, safer vehicles, improved road safety for all road users, and intelligent risk assessment that can identify high-risk operators or drivers.</td>
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<td>Productivity</td>
<td>Telematics can provide improved driver management and asset coordination (e.g. on-board mass monitoring is a tool to maximise vehicle loads within legal limits and to facilitate a more efficient and agile supply chain). Similarly, more efficient driving can lower fuel costs. Reduction in red tape by minimising requirements to maintain paper records and more efficient management of regulatory and compliance obligations. Improved efficiency, lower compliance costs.</td>
<td>Better management and safer use of vulnerable infrastructure (e.g. matching vehicles with roads and bridges). Better access to infrastructure and resource-use efficiency (e.g. potential road pricing applications and higher axle weights).</td>
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3 These benefits were underpinned by the National Transport Commission, National in-vehicle telematics strategy: the road freight sector, 2011; and Transport Certification Australia, ‘Operational Pilot of Electronic Work Diaries and Speed Monitoring Systems: Final Report, 2013, chapter 7.
| Environment | Improved congestion avoidance through real-time traffic information and route optimisation.  
Facilitation of an efficient and agile supply chain that maximises vehicle mass and reduces vehicle trips to undertake the freight task. Applications that optimise engine performance can increase fuel efficiency, with clear environmental benefits.  
*Reduced environmental impacts.* | Better management of the environment (e.g. low emission zones near communities heavily exposed to truck movements). |

### 1.2 What is the problem being addressed?

Feedback from industry has indicated that the lack of common and clear policies as to how telematics data will be used has been a barrier to the take-up of this technology; a clear approach, consistent with compliance objectives, will provide the confidence for industry to invest. The aim is not to increase the regulatory burden for industry but to provide ways for industry to meet their compliance requirements more efficiently.

A key challenge for governments is to establish consistent and equitable enforcement practices to ensure telematics use is not discouraged or penalised. It was for this reason that the *National in-vehicle telematics strategy*[^4] recommended the development of government policy to support in-vehicle telematics use.

Similar issues for governments arise for any new compliance application: What data will be captured? Who will have access to it and how will it be used? How is driver privacy protected? A framework for telematics can assist by setting out general policy principles to address these issues, facilitating the creation of new applications in the future.

Historically, Australia has developed compliance and enforcement approaches to telematics on an application-specific basis. The Intelligent Access Program (IAP) was developed to manage network access and a compliance model was established for this purpose based on back-office exception reports.[^5] More recently, the Electronic Work Diary (EWD) Operational Pilot developed a model for electronically recording work and rest hours that was primarily focused on (but not limited to) roadside review of information. The treatment of EWD data for enforcement purposes created a significant amount of discussion during the pilot. There are a number of other emerging telematics applications that could help improve safety, productivity and efficiency, potentially including speed management, vehicle maintenance and road pricing.

Each of these telematics applications are likely to have common features. They will typically have greater accuracy compared with written records,[^6] greater accessibility (cloud-based data can be accessed anywhere, anytime, and often in real time) and greater resolution of records. Given these features, there are common policy issues that arise for each new application. These issues could be addressed at a framework level to ensure a consistent approach is adopted and to avoid having to solve the same problems for each new application. These policy challenges include:

- how privacy is managed, given the greater detail and accessibility of information
- how breaches are treated, given the greater accuracy and detail of the records and the higher probability of detection
- how compliance and enforcement can be more efficient (for government and industry).

If these questions are not addressed, there is a risk for industry that the increased accuracy and transparency of telematics data will result in more infringements and additional enforcement – scrutiny that can be avoided through retaining paper-based systems (or in some cases having no system at all). Uptake of compliance-related telematics would therefore likely be low in a voluntary environment, and the benefits unrealised. Rather than attempting to tackle these issues each time a new application is examined, Australia has an opportunity to develop a compliance framework that will encourage greater

[^5]: Under this approach, regulators receive noncompliance report by exception and do not have general access to IAP access data. The system is managed by TCA.
[^6]: Although some may similarly rely on self-declaration.
use of telematics, will benefit industry, government and the community, and will allow new applications to be developed more quickly and easily in future.

In addition to the common policy challenges, many compliance-related applications are based on common data: basic information about the vehicle (including location, speed and time) that can be used in different combinations to demonstrate compliance in a range of areas. A fragmented policy approach could result in conflicting requirements, leading to the same data being captured multiple times, potentially requiring vehicles to be fitted with multiple devices fulfilling similar purposes. A framework approach that includes defining a common dataset – a data dictionary of key information – would facilitate the use of one device for many applications, whether they be commercial- or compliance-related. A common dataset would also assist interoperability, both for drivers who may move between operators and for other parties in the supply chain who may need to require telematics data to gain assurance that chain of responsibility obligations are being met. In addition, a common dataset can facilitate competition and innovation.

The ability to comply may also be affected by regulatory costs, particularly for smaller operators. For telematics systems to address the cost-to-comply challenge, they must be price-competitive. The market should also be responsive to smaller operators and owner-drivers who are seeking devices that are fit for their purposes. A clear set of principles and a common dataset may provide greater certainty for operators to invest in telematics systems.

### 1.3 Objectives

The objective of the framework is to provide certainty in national policy on the use of telematics data to improve compliance and enforcement. By increasing certainty and consistency in national policy, the framework is intended to encourage industry to adopt telematics and provide for improved road safety, productivity and environmental outcomes that ultimately contribute to higher standards of living.

Governments recognise that telematics technology provides a tool to help industry increase its compliance and to demonstrate its compliance to regulators. This has been the focus of telematics in the industry to date and is expected to have a key role in the future. Operators and drivers can also voluntarily adopt telematics to be used by governments to enforce the law. For example, in the future an operator could introduce an approved EWD into its fleet for its drivers to record their work and rest times. In this context, because an EWD would be used for a regulatory purpose, it is reasonable that EWD records may be accessed by regulators and enforcement agencies given that it is equivalent to accessing a written work diary. But the same EWD will provide guidance to drivers on when rest breaks are due, which will assist compliance. The telematics device being used as an EWD could also run commercial applications, for example, to assist the operator with its fleet management.

The value of the telematics framework lies in distinguishing between these different uses for telematics. It recognises that the evidentiary value for telematics, and the level of access to telematics data by enforcement agencies, is dependent on the compliance or enforcement approach being used. Such an approach could result in a range of standards being appropriate, depending on the specific objectives being pursued. Consistent with best practice regulation principles the standards chosen should seek to minimise the regulatory burden imposed on business in order to achieve the desired objective.

- The objective of **providing a resource to improve compliance and enforcement with telematics** is to recognise that safety, productivity and environmental benefits can be attained through responsive regulation, intelligent risk-based enforcement, audit-based schemes, chain of responsibility, safety management systems and industry schemes.

- The objective of the **common dataset** is to facilitate interoperable and integrated telematics systems that are consistent with international standards and are capable of hosting multiple commercial- and compliance-related applications. An additional objective is to support data sharing among parties in the chain of responsibility.

- The objective of the **framework principles** is to protect operators and drivers from intrusive or unreasonable access to personal information by regulators and enforcement agencies and to ensure governments handle telematics information consistent with the Australian Privacy Principles (APPs).
1.4 Key functions of the framework

The primary purpose of the framework is to clarify in what circumstances governments will access telematics data and to protect drivers from intrusive or unreasonable access to personal information generated by telematics.

The framework will have three functions:

1. Provide a resource for governments and industry to improve compliance and enforcement outcomes with telematics

   The framework will provide a reference for regulators, enforcement agencies and operators to use telematics to improve responsive regulation, traditional enforcement, audit-based schemes, safety management systems, chain of responsibility and industry-based schemes.

2. Maintain a common dataset

   The framework will maintain a common telematics dataset based on international standards. The common dataset will provide for standardised and interoperable telematics systems capable of facilitating multiple commercial- and compliance-related applications. This will ensure that telematics applications used for compliance-related purposes can be integrated into commercial systems. This will help providers continue to innovate in a competitive market.

   While the common dataset will enable ‘bundling’ of commercial- and compliance-related applications, a single integrated system may have multiple interfaces to ensure regulators and enforcement agencies only access data required for regulatory purposes.

   The common dataset will be underpinned by a data dictionary. The data dictionary will provide the essential requirements of a compliance-related telematics system, including vehicle identification number (VIN), time stamping and global navigation satellite system (GNSS) location. Initially, the data dictionary will cover five base applications:

   - recording work and rest hours
   - mass monitoring
   - speed monitoring
   - access
   - consignment location monitoring.

   The design and function of telematics need to be safe and not pose additional risks to drivers. The development of the telematics systems and protocols needs to take into account Human Machine Interface (HMI) and driver distraction, else all benefits risk being negated through increased crashes due to driver distraction.

3. Establish framework principles

   The framework will establish principles endorsed by participating Australian jurisdictions. The framework principles relate to:

   - privacy and protection of information
   - certainty of when telematics data will be accessed for enforcement purposes
   - reasonable and appropriate access and collection of telematics data
   - equity of treatment before the law
   - the level of assurance required of telematics systems for compliance and enforcement purposes.

1.5 Vision

The realisation of safety, productivity and environmental benefits will be dependent on how telematics is optimised within compliance and enforcement strategies by industry and governments. The vision for the future use of telematics recognises that telematics is a tool that can underpin compliance and enforcement reforms to contribute to improved safety, productivity and environmental outcomes.

**Vision of the compliance framework for heavy vehicle telematics**

*Widespread use of in-vehicle telematics supported by responsive management and reporting systems has delivered better levels of regulatory compliance. This has led to increased accountability and self-regulation within industry and allowed more targeted enforcement of high-risk operators. Overall this has made a significant contribution to lowering crash rates among heavy vehicles, improving productivity and lowering their environmental impacts.*

1.6 Strategic context

In 2011 the NTC released the *National in-vehicle telematics strategy: the road freight sector* ‘to drive the transition to the wider use of technology for the benefit of all Australians.’\(^8\) The strategy recognised that consistent and equitable enforcement practices were desirable to ensure that telematics use is not discouraged or penalised, and recommended the development of an enforcement policy to support in-vehicle telematics use.

In 2012 the then Standing Council on Transport and Infrastructure approved the *Policy Framework for Intelligent Transport Systems in Australia*. The policy framework seeks to ensure that ITS used in each jurisdiction is compatible and that development occurs around a set of agreed policy principles: ‘compliance and enforcement should be taken into account by jurisdictions in developing any regulatory arrangements for ITS. This should be approached from a national perspective with model national law which each state working collaboratively to implement.’\(^9\)

Between 2011 and 2013, the EWD Operational Pilot examined the practicalities of electronic recording of work and rest hours. As part of that pilot, the NTC examined the enforcement and other policy aspects of EWDs. The pilot raised issues of how telematics could change the current compliance and enforcement paradigm, with the potential for smarter, risk-based enforcement, improved use of resources and a review of the balance between roadside and back-office enforcement. However, many stakeholders indicated that these questions went beyond fatigue and that a broader solution needed to be developed.

1.7 Structure of this paper

This paper identifies opportunities for telematics to underpin improvements in compliance and enforcement outcomes. On the basis that there are opportunities associated with regulatory telematics, the paper identifies and discusses the delivery of a common dataset to ensure regulatory telematics systems are developed consistently with international standards and can be integrated with commercial applications. Recognising that there may be a role for telematics across a range of compliance activities, from roadside enforcement through to meta-regulatory industry schemes, the paper then addresses the evidentiary value governments should expect from regulatory telematics systems. The paper then considers a range of issues, including privacy, access to data and mandatory telematics in the road freight sector, and concludes with the framework principles.

The framework principles are a culmination of the discussion, stakeholder feedback and policy positions charted in the final policy paper and represent policy outcomes in relation to privacy, access to data for compliance and enforcement purposes, minimum standards of evidentiary value, regulatory efficiencies and the application of the principles.

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\(^8\) National Transport Commission, *National in-vehicle telematics strategy: the road freight sector*, 2011, p.1

2. Opportunities for telematics

2.1 Improving compliance with telematics

Telematics provides industry and governments with a tool to improve the accuracy, depth and breadth of the information that demonstrates and improves compliance and risk assessment. By way of example, the EWD Operational Pilot identified that the benefits of EWDs are primarily related to:

- improved data accuracy and transparency
- providing real-time data that enables operators to respond immediately to actual breaches and monitor performance over time
- in-vehicle driver information that enables drivers to plan their work and rest and to take action when alerted to an imminent or actual breach
- improved compliance with fatigue rules, which is expected to contribute to a reduction in heavy vehicle crashes as these rules are based on expert advice regarding minimisation of driver fatigue.

The safety benefits from adopting EWDs will be greater if EWDs are adopted by operators that are not using pre-existing commercial telematics systems (particularly those commercial systems that proactively manage fatigue). The safety benefits will also be affected by the safety culture of operators – the greatest safety benefit will be achieved where the EWD is introduced as part of a culture of fatigue management monitoring, reporting and intervention, to improve fatigue compliance.

In the longer term, telematics technology is a tool that can underpin a paradigm shift in enforcement, with the ability to intelligently assess risk and to identify high-risk operators and drivers and to re-assess the balance between roadside enforcement and audit-based compliance. Compliance assurance in turn benefits highly compliant operators who can demonstrate their compliance and places small breaches in context.

In addition to these general benefits, there are opportunities for telematics to support responsive regulation, roadside enforcement, chain of responsibility, alternative approaches to traditional compliance and industry schemes.

2.2 Improving responsive regulation with telematics

Responsive regulation is a compliance methodology that advocates an adaptive and proportionate response to noncompliant behaviour. It is a behavioural approach that can be used in different contexts, including roadside enforcement, chain of responsibility and audit-based schemes. Telematics has the ability to complement responsive regulation because it enhances an organisation’s capability to make informed assessments of compliance and to identify systemic behaviours.

Used effectively, telematics can positively influence drivers’ behaviours and attitudes. As identified in the NTC’s draft Heavy Vehicle Compliance Review, compliance can increase among those willing to do the right thing (the engaged and committed) through education and information technology aids. Telematics can also increase knowledge about road and traffic conditions, such as local speed information, which in turn provides the tools to increase compliance.

Telematics is a tool that may be used by regulators to ensure national laws and enforcement policies are uniformly and consistently applied. This is expected to positively impact drivers’ perceptions of substantive purpose and procedural fairness. In doing so, their willingness to comply is likely to increase under a responsive regulation model.

Noncompliance may also be caused by the economic imperative. Low barriers to entry and marginal returns can exacerbate the economic imperative for noncompliance. Moreover, a lack of willingness to comply and economic imperative motivators of noncompliance share an element of opportunism – the risk assessment that the breach will remain undetected and that there will be no enforcement.

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12 ibid., chapter 5.
consequences for the action taken. Telematics used for regulatory purposes will reduce opportunities for drivers, operators and others in the chain of responsibility to assess the risk of detection as low. This in turn is likely to increase levels of compliance.

2.3 Improving roadside enforcement with telematics

Traditional enforcement is an important and valuable deterrent for noncompliance in the heavy vehicle sector. Because of the deterrent feature of traditional enforcement, it is usually based on highly visible roadside activities that rely on an efficient system of identifying breaches, motivations for noncompliance, and subsequent action. This approach will continue to play an important role in reducing noncompliance.

Traditional enforcement assumes that drivers and operators are rational actors capable of responding to disincentives, and that if offenders are detected with sufficient severity, then they, and others, will be deterred from future violations. However, the deterrent effect is markedly reduced when breaches occur as a result of an inadvertent mistake or lack of awareness of the law. In such circumstances telematics can improve general understanding of the law, and subsequently compliance, by providing accurate advice, warnings, vehicle diagnostics and up-to-date network information.

The deterrent impact of roadside enforcement increases when the probability of detection increases. This can be the probability of being intercepted but also the probability of a breach being detected during an interception. Telematics systems that provide on-board axle-group mass measurements that are sufficiently accurate and tamper-evident may be relied on at intercepts and provide an invaluable improvement to the effective detection of over-mass breaches. Likewise, the effective analysis of a written work diary to identify breaches of work and rest hours and high-risk patterns of behaviour is reliant on Authorised Officers having expert knowledge of complex fatigue laws and familiarity with the design and workings of the written work diary. Compliance assessment software based on telematics technology does not remove officer discretion at the roadside but improves the evidence base upon which discretionary matters can be decided.

2.4 Improving alternative approaches to traditional enforcement with telematics

Alternatives to traditional enforcement are intended to enhance a culture of safety in the workplace while increasing transport efficiencies. These efficiencies will be achieved by reducing the costs of compliance, allowing operators greater flexibility in determining how to manage compliance. Examples of alternative approaches include audit-based schemes, such as the National Heavy Vehicle Accreditation Scheme (NHVAS) for mass, maintenance and fatigue modules, and safety management systems. Safety management system is a term used to describe a planned, documented and verifiable method of managing hazards and associated risks while ensuring that these risk controls are effective.

Civil aviation, maritime and rail are the principal transport industries in Australia that have structured safety management systems. In road transport, advanced fatigue management (AFM) could be considered a subset of the safety management system approach.

There are a number of ways in which telematics can be useful in managing the increased risks associated with the regulatory advantage offered under accreditation. On-board mass monitoring can provide remote and highly granular data in real time. Similarly, electronic recording of work and rest hours can improve driver scheduling and provide accurate and current information to enable an operator to actively manage driver fatigue regulatory requirements. Telematics can also provide certainty to regulators and enforcement agencies that small breaches are being identified and actioned within a self-reporting model.

Safety management systems are not recognised in the HVNL and, while a small number of larger heavy vehicle operators have adopted safety management system principles as a business model, they are not recognised in the law and those operators do not receive a regulatory benefit for doing so. The experience in other sectors further indicates that a safety management system approach is more effective and trusted when governed by an industry code and a framework of standards and expectations developed and overseen by an industry regulator. The exploration of safety management

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13 ibid., p 4
15 This option has been discussed by the NTC in relation to EWDs; see National Transport Commission, Preparing Australia for Electronic Work Diaries: Regulatory issues paper, 2013, p. 54.
systems in the road freight and bus industries is directly relevant to the extent that safety management systems could utilise telematics applications and systems, given that telematics can be used to monitor, influence and improve driver behaviour within an organisational approach to safety.

2.5 Improving chain of responsibility with telematics

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 schedulers, loaders and other parties, 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 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.

2.6 Improving industry schemes with telematics

Meta-regulation occurs where the power of customers, industry, the media and other parties is leveraged to induce change. Industry schemes are an example of meta-regulation, and there are a number in place today.

TruckSafe is an industry-based scheme designed to promote safety and give confidence to purchasers along the supply chain that they are contracting high-quality operators. TruckSafe is audit-based and principally focused on ensuring processes are in place to meet the four standards against which participants are audited.

In a similar fashion, codes of practice are used by industry to exceed minimum requirements of compliance and there are opportunities for telematics to contribute to – and build on – codes of practice. The National Logistics Safety Code, which was introduced by the Australian Logistics Council (ALC), is used to assist industry to manage and maintain safety across the supply chain. The code is voluntary and can apply to all compliance-related activities within a supply chain, including fatigue and safe loading. The National Logistics Safety Code also has elements of a recognition scheme in that participants can generate marketing opportunities by demonstrating increased safety practices, thereby reducing the risk exposure of customers and suppliers.

Another development being led by the NHVR and industry is a proposed safety rating system intended to encourage freight customers to use their purchasing power to preference safer operators. The initiative is intended to be a voluntary system to award star ratings to scheme participants where they are assessed as meeting set criteria relating to safety and compliance.

Telematics can assist participants in industry schemes to improve business systems and to provide accurate and current maintenance and driver information to improve safety outcomes and to identify training gaps. Telematics can improve driver, vehicle and operational monitoring and thereby increase participants’ understanding of their compliance risks and obligations under an industry scheme or code of practice. Schemes that compare operators are data-rich approaches requiring accurate and

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16 National Transport Commission, Heavy Vehicle Compliance Review: Consultation draft, 2013, p. 91
17 ibid., p. 95
comprehensive information to assess the relative safety or performance of participants who may benefit from telematics-generated information.

It is suggested that the required evidentiary value of information derived from these schemes will be dependent on the extent to which participants seek to use that information to demonstrate compliance with the law.

2.7 Opportunities for telematics: stakeholder feedback

Opportunities to improve compliance with telematics was generally recognised by stakeholders who provided their views on the draft framework. Government stakeholders, such as Transport for New South Wales (TfNSW) and Queensland Transport and Main Roads (TMR), particularly acknowledged the value of identifying patterns of behaviour and longer term opportunities to improve intelligent risk analysis. The Australian New Zealand Policing Advisory Agency (ANZPAA) agreed that there are responsive regulation opportunities:

*It is the view of police that any measures that might be put in place by industry/regulators/enforcement to analyse and utilise telematics data will influence how much understanding about non-compliance can be drawn and what regulation responses can be made accordingly.*

However, ANZPAA expressed concern that telematics does not provide a comprehensive picture of compliance (e.g. the capture of non-driving work in EWDs is based on self-declaration) and the opportunities and benefits should not be overstated.

In relation to traditional enforcement, TMR stated that if the proposed benefits are to be realised, enforcement officers will need to be provided with the necessary technology and training to assess and use telematics information. ANZPAA stated concerns that telematics could result in reduced roadside enforcement, which has a valued deterrent effect — and that the value of telematics to roadside enforcement needs to be further tested. Both ANZPAA and TfNSW noted that telematics may be able to identify patterns of behaviour but would not identify motivations for noncompliance, which is a key requirement of adopting responsive regulation. ANZPAA stated that telematics will be critical to encouraging a safety management system only if it is applied correctly, monitored and managed, and adopted within the operator’s daily practices.

In relation to alternatives to traditional enforcement, regulatory telematics applications present an opportunity for government to work with industry over time. TMR agreed that it would be useful if audit-based schemes enabled a refocusing of roadside enforcement resources. WA Main Roads preferred a safety management system approach, particularly for dealing with breaches identified with telematics.

ROAD to SAFETY Pty Ltd stated that operators should be encouraged to participate in accreditation schemes and to use telematics to demonstrate compliance, which will require regulators and industry to work together to find the appropriate trade-off between disclosure and breach patterns.

In relation to chain of responsibility, TMR noted that telematics data sharing between parties in the chain may require legislation, and suggested that further analysis of the role of telematics should be explored through the chain of responsibility project. Similarly, the Office of the Australian Information Commissioner (OAIC) would support the provision of additional guidance about the extent to which third parties in the chain of responsibility can access telematics data. ANZPAA stated that chain of responsibility can be complex and telematics, if mandated, ‘will undoubtedly provide support in identifying the various levels of [chain of responsibility].’ ANZPAA and the Australian Trucking Association (ATA) reiterated that chain of responsibility obligations can be met without recourse to telematics. The ATA further raised issues with the chain of responsibility focus on prosecutions and that the concept does not apply to vehicle maintenance — an area with strong potential for telematics.
In relation to industry schemes, TMR agreed that governments can influence the development of industry schemes by setting the basic standards needed for telematics to flourish – but observed that such schemes have the potential to favour large established players within the industry and if poorly designed, support only a veneer of compliance rather than actual compliance. ANZPAA observed that given the framework would focus on a voluntary approach, this ‘may well create an “unlevel” playing field in the heavy vehicle transport industry, with those that can afford it more inclined to implement it, while those that can’t, may not’. ANZPAA observed that given the framework would focus on a voluntary approach, this ‘may well create an “unlevel” playing field in the heavy vehicle transport industry, with those that can afford it more inclined to implement it, while those that can’t, may not’.  

Given that the benefits of telematics are tied to how the data is managed in addressing risks and improving driver and fleet performance, TCA observed that heavy vehicle operators need to make informed purchasing decisions about follow-up support, staff training and data management practices. To improve market knowledge, it may be useful for governments to work with industry to highlight best practice data management approaches that increase the benefits of regulatory telematics. There may also be a role for industry schemes to provide advice to operators about how best to manage compliance data.

2.8 Opportunities for telematics: policy position

Operators, drivers and others in the chain of responsibility are encouraged to adopt telematics to increase compliance, safety and productivity outcomes within audit-based schemes, safety management systems and industry schemes.

Regulators and enforcement agencies are encouraged to use telematics to increase industry’s willingness to comply and to deter noncompliance through both traditional enforcement and back-office investigations – and to explore opportunities to harness telematics technology and compliance assessment software to apply nationally consistent enforcement policies.

2.9 Opportunities for telematics: final recommendation

The NTC recommends that the framework be adopted to provide a reference for regulators, enforcement agencies and operators to facilitate better use of telematics to improve responsive regulation, audit-based schemes, safety management systems, chain of responsibility and industry-based schemes.

29 TMR, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 6
30 ANZPAA, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 14
3. Adopting a common dataset

Over the last decade telematics has shifted from single-purpose in-vehicle devices towards dynamic, multipurpose and intelligent platform-based approaches that use remote (including cloud) technology. The common dataset that accompanies the framework must be sufficiently agile and performance-based to accommodate technology advances and to facilitate the affordable integration of commercial- and compliance-related telematics applications. The common dataset must also be aligned with international standards to ensure Australia is keeping pace with global trends. Figure 1 illustrates how common data from a single telematics system can be used for different compliance and commercial purposes.

**Figure 1: Typical data elements by heavy vehicle application**

![Diagram of data elements by heavy vehicle application](image)

3.1 Benefits of a common dataset

The compliance and commercial benefits of telematics are linked. There are significant opportunities for operators that integrate regulatory telematics as part of vehicle and driver monitoring and managing performance. While these opportunities can partly be attained in commercial applications available today, integrating commercial and regulatory applications enables operators to optimise systems and to attain significant benefits. For example, the accuracy and alignment of ‘regulatory time’ with real time using EWDs means that driver warnings and management can be relied on more so than in commercial applications that may not have accurate work and rest hours to base its warnings and advice on. Operators will also have an improved understanding of hours worked by drivers for other operators.

The benefits of regulatory telematics for operators and drivers will therefore largely depend on market solutions and the extent to which regulatory and commercial features are integrated into a single system, hence the aim of the common dataset is to ensure that bundling regulatory and commercial applications is possible.

**Figure 2** illustrates how a single telematics device with a common dataset can support both regulatory and commercial applications. The circles represent potential benefits for the community and industry. It is suggested that community benefits, such as vehicle safety, are also of value to industry, hence the community benefits sit inside the industry-specific benefits.

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31 Courtesy of Transport Certification Australia, 2014
3.2 International standards

The relevant international standards are primarily contained within ISO 15638, *Intelligent transport systems – Framework for cooperative telematics applications for regulated commercial freight vehicles*, known as TARV. TARV seeks to support commercial and regulatory functions within a single platform that can operate through open standards and in a competitive market.\(^3^3\)

TARV uses commercial system providers, a wireless interface medium and remote connection access. Adopting a TARV model, bulk telematics data is not held by governments. For example, data may be managed by commercial service providers and not centrally held by governments. Australia has led the international community in the development of TARV. Existing applications in Australia are similarly based on this model, referred to locally as the National Telematics Framework.\(^3^4\) One of the benefits of TARV as an ISO standard is the structured process to ensure development, maintenance and harmonisation across other standards. The following applications are set out within TARV.\(^3^5\)

| ISO 15638-8         | TARV – Vehicle access management and monitoring |
| ISO 15638-9         | TARV – Remote electronic tachograph monitoring |
| ISO 15638-10        | TARV – Emergency messaging system/eCall        |
| ISO 15638-11        | TARV – Driver work records                    |
| ISO 15638-12        | TARV – Vehicle mass monitoring                |
| ISO 15638-13        | TARV – Mass data for regulatory control and management |
| ISO 15638-14        | TARV – Vehicle access control                 |
| ISO 15638-15        | TARV – Vehicle location monitoring            |
| ISO 15638-16        | TARV – Vehicle speed monitoring               |
| ISO 15638-17        | TARV – Consignment and location monitoring    |
| ISO 15638-18        | TARV – ADR (dangerous goods) monitoring       |
| ISO 15638-19        | TARV – Vehicle parking facilities            |

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32 National Transport Commission, 2014
34 TCA, TCA Corporate Capability Statement, 2014
35 Except for ISO 15639-13 ‘Mass data for regulatory control and management,’ which is under development, each standard is currently at an Approved Technical Standard phase.
Not all compliance-related applications have their own TARV standard. For example, road pricing is not one of the specific applications included in the above standards, but the application could take the relevant elements from TARV standards (such as vehicle location and access control) to design a road pricing unit. Utilising the essential features of TARV, common framework architecture, common platform parameters and generic vehicle information, this unit could then be compatible with other TARV-compliant applications and a single system could therefore have multiple purposes.

TCA reports that while not all telematics systems and devices being used by industry today may have every essential element of the data dictionary, as a general rule all requirements in the TARV standards are derived from existing experience and domain experts in the telematics sector. Industry stakeholders have indicated that a greater challenge will be the establishment of standard telematics reporting systems rather than the in-vehicle devices. This is a role for the market and will be especially important for chain of responsibility.

TARV standards, and other international data management standards, should also underpin the development of a national data strategy and any other efforts to use telematics to provide government with de-identified and aggregated data, or for governments to provide telematics users with network information.

3.3 Data dictionary

Interoperability is the capacity for systems to work together. It should be noted that this requires in addition to technical and operational, a commercial agreement. Depending on how systems are attempting to interoperate, this may require:

- a common communication protocol (e.g. a common language)
- a common data form (e.g. a common set of words)
- a common meaning of the data (e.g. common word definitions)
- a common understanding of how the data is to be used or was generated (e.g. whether the shared information is publicly accessible)
- a common understanding of what impact sharing the data will have
- a common understanding of the constraints and assumptions.

To facilitate interoperability, a data dictionary is a key component of the common dataset. TCA (through TARV) has developed a draft data dictionary, contained in the appendix of this paper. It will help in effectively exchanging information across different telematics systems by setting an agreed language and a common understanding of data type (such as numeric, text or binary data types) and relationships between data. Each system may implement its own method of data management, provided that the interface adheres to the agreed definitions.

The data dictionary will provide the essential requirements of a compliance-related telematics system including:

- VIN
- timestamp requirements
- location (latitude, longitude and altitude)
- manufacturer identification.

The preliminary data dictionary proposed by TCA supports five initial applications: recording work and rest hours; mass monitoring; speed monitoring; vehicle location monitoring; and consignment location monitoring. Further data elements can be added as new applications are considered.

Importantly, while some elements of the data dictionary may be relevant across multiple applications (such as location or time), others will be application-dependent (such as driver identification). This approach ensures that information is only collected and/or used for an application where it is relevant and required. TARV, and the data dictionary, enables developers to ‘take off the shelf’ those elements that are critical to the specific application.

36 The data models presented here are constructed using human-readable ASN.1 notation, which is an internationally recognised standard that can be readily mapped into a data structure used by the target application.
3.4 The relationship between standards and operators’ systems

It is a basic tenet of TARV that jurisdictions determine how its approval processes are met. The adoption of a common dataset not only facilitates a single in-vehicle platform that can deliver both commercial- and compliance-related applications, but an open standards approach also encourages a competitive market and provides the groundwork to facilitate greater use of operators’ systems for compliance-related activities.

The adoption of TARV standards will not determine the extent to which operators’ systems can be used to demonstrate legal compliance, given there are a number of policy issues under consideration (e.g. the evidentiary value of operators’ systems) and there are a range of auditing approaches that could be considered by governments. Nonetheless the TARV standards provide the technical framework so the adoption of operators’ systems is, at the very least, feasible. The issues relating to operators’ systems are explored in more depth in the next chapter.

3.5 Stakeholder feedback

Submissions largely supported the approach taken to develop a common dataset based on international standards. The South Australian Freight Council (SAFC), for example, highlighted ‘the need for assurance that data gathered through heavy vehicle telematics is reliable, robust, accurate and harmonised with international standards’.37 Interoperability is a critical benefit.

TMR supported the general approach but sought to ensure the common dataset can complement other standards, such as data dictionaries developed by SAE International. WA Main Roads and the Truck Industry Council (TIC) also sought to ensure clarity as to how TARV standards and the common dataset interrelate with other standards. While police agencies supported a common dataset, ANZPAA sought clarity as to how the framework can be consistently applied at a national level.38

The ATA recommended that there be ‘no bundling of enforcement-related and industry-related telematics “solutions” in a single platform, system or device’,39 and that the market should decide and drive innovation and uptake.

3.6 Common dataset: final policy position

Establishing a common dataset and data dictionary are critical developments for the establishment of interoperable and open standards for telematics systems. This approach will guard against industry concerns that regulatory telematics will require tailored technologies, or a unique single-purpose device, and bring down costs for operators by enabling service providers to develop integrated commercial and regulatory solutions.

To ensure Authorised Officers can only access information relevant to the regulatory task, the ability to integrate commercial and regulatory applications in a single system does not prevent data streams from being siloed into separate commercial and regulatory interfaces.

3.7 Common dataset: final recommendation

The NTC recommends that that the common dataset, including the data dictionary, is finalised by TCA in consultation with stakeholders and is subsequently approved by the Transport and Infrastructure Council for implementation as part of the compliance framework for heavy vehicle telematics.

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37 SAFC, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 1
38 ANZPAA, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 4
39 ATA, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 4
4. Evidentiary value of telematics

4.1 Distinguishing between regulatory and commercial uses

While a telematics system may have both commercial and regulatory functions, it is important that governments distinguish between them given that regulators and enforcement agencies should not have a reason to access commercial data, except for a permitted purpose under the HVNL. Conversely, governments will have an expectation that they can access regulatory information as a matter of course, particularly in roadside enforcement conditions.

In these cases – particularly if infringements are issued based on the telematics data – telematics data is intended to be used for enforcement purposes and it is critical that the evidentiary value of the data is addressed. Governments require a higher level of assurance of the integrity, security and performance of the system for those systems that are being used for enforcement. For example, the integrity of the system should ensure the data is time and date stamped and that the system is tamper-evident. Industry may have similar requirements but not necessarily to the same standard. In other words, it should be ‘fit for purpose’. The compliance framework therefore seeks to recognise that the minimum standards for telematics should distinguish between commercial and regulatory functions.

4.2 Minimum standards methodology

The level of assurance governments will require of a telematics system is dependent on the policy requirements of the regulatory application and the extent to which the regulatory application is used for enforcement purposes. This approach is reflected in Figure 3, which sets out a methodology to determine the level of assurance required of a telematics system.

Figure 3: Determining the level of assurance required of a telematics system: methodology

* Level of assurance is dependent on extent to which audit-based schemes are subject to roadside enforcement.
** This is not an indication that telematics should be mandatory to meet chain of responsibility obligations. Telematics is only used to demonstrate legal compliance under chain of responsibility if parties in the chain choose to adopt telematics.
The methodology aims to ensure governments only set out minimum standards for a high level of assurance when they have an enforcement stake in the telematics data, and that when operators are using telematics for non-regulatory purposes, the minimum standards and level of assurance is a matter for industry (this is encapsulated in principle 8 of the framework principles in section 7.3 of this paper). The methodology is intended to be incorporated into the compliance framework for heavy vehicle telematics.

Other compliance approaches canvassed in this paper, including responsive regulation, alternative compliance (both audit-based and safety management systems), chain of responsibility and industry schemes are not focused on infringements or other forms of enforcement action and do not have the same prosecutorial emphasis. To this end the evidentiary issue is minimised when regulators and enforcement agencies shift away from roadside enforcement approaches because approaches based on operators and other parties meeting their compliance obligations naturally shifts the onus onto them to demonstrate legal compliance. It becomes less incumbent upon regulators and enforcement agencies to ensure a minimum evidentiary standard is met.

Adopting this approach, if an operator is using accreditation to both demonstrate legal compliance and increase its compliance levels generally, the minimum level of confidence in the integrity and performance of the system would be rated by governments as medium, not low. 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 higher level of assurance should not be expected.

The level of confidence required in the performance of the system is dependent on the requirements of policy and the compliance or enforcement approach taken, rather than the application:

- **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 regulatory approvals process (such as EWD) or certification (such as IAP).

- **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.

- **Will the data only be used by industry to generally increase compliance levels?** If so, the level of assurance is a matter for industry.

This approach potentially provides certainty for regulators, enforcement agencies, operators and drivers. The telematics industry is not highly regulated and the methodology will protect operators and drivers from substandard telematics devices. If systems and devices are not of sufficient quality, this could result in incorrectly identified breaches and potentially in the miscarriage of justice. Establishing a high level of assurance also increases certainty within the judicial process – protecting the interests of all stakeholders, not just that of regulators.

### 4.3 Operators’ systems

The methodology and minimum standards for regulatory telematics does not preclude operators from using their own systems for a regulatory purpose, including regulatory purposes that require a high level of assurance by governments. However, it is recognised that because the data must be sufficiently accurate to be relied upon by governments, operators and drivers, these systems would be subject to the same certification or approvals process as required by third-party service provider offerings.

Interoperability between commercial and regulatory applications should enable operators’ systems to be further developed for regulatory purposes. The importance of the development of a common dataset to facilitate the interoperability with operators’ systems is discussed in **Chapter 3**.

### 4.4 Evidentiary value of telematics: stakeholder feedback

Stakeholders broadly welcomed the development of a minimum standards methodology to distinguish between regulatory and commercial requirements.
The ALC recommended that a high level of assurance requires certification and that the framework principles should reflect this approach: “telematics data cannot be used to sustain a fine/prosecution … unless some or all of the instrumentation forming part of the system is “certified” to producing specific data within a specified tolerance range”.40

The ATA stated that all data is potential evidence and called on the NTC to recognise that ‘industry data’ carries the same evidentiary value as ‘regulatory data’ for the purposes of a court.41 The ATA was concerned that the approach to telematics in the discussion paper would replicate IAP:

Regulatory concerns over data quality appear to be driving demands for an IAP-based system, common dataset and data dictionary, certification of telematics systems and preference for mandatory approaches etc. However, the pre-occupation with producing perfect information is misplaced.42

Mr Hannifey, a heavy vehicle driver and safety advocate, raised concerns that drivers may be subjected to inaccurate telematics data, for example, where a faulty device indicates that a driver is operating in violation of fatigue or speed laws, resulting in an infringement or penalty.43 Mr Hannifey reiterated the importance of telematics systems recording times and events accurately, as a measure to protect drivers from false accusations.

ANZPAA stated that not all telematics information is accessed for roadside enforcement, but this does not reduce its relevance in an investigation. It is the view of the police that:

If a telematics device does not have evidentiary value (in terms of probity and admissibility), police question what place it might have within a compliance framework and how it can be relied upon to demonstrate compliance.44

ANZPAA also linked evidentiary value to road safety outcomes. In its view, a telematics system with a high evidentiary value that is part of the penalty process is more likely to deter unsafe behaviour.45

In discussions with the Victorian Department of Justice, a high level of assurance for regulatory applications was preferred, given that a reliance on alternative approaches may result in frequent challenges to the accuracy and reliability of the evidence. Significant challenges to the accuracy of the data would undermine the integrity of the system and result in costly court challenges.

4.5 Evidentiary value of telematics: policy position

The NTC agrees with industry that data generated from any telematics system – regardless of the standards to which they are designed – is admissible as evidence before the courts. While only the courts can determine the evidentiary value of data generated by a telematics system, a key issue for governments is to have sufficient confidence in the data to identify breaches and to initiate enforcement action, particularly in the context of reasonable and legitimate enforcement of the HVNL.

The minimum standards methodology has been developed to recognise that not all telematics systems adopted by industry must have the same level of assurance. A highest level of assurance is only required when data is accessed for enforcement purposes. This approach protects operators and drivers from being incorrectly targeted for breaches and frees industry to set its own minimum standards for commercial systems that do not have a regulatory function.

4.6 Evidentiary value of telematics: final recommendation

The NTC recommends that the minimum standards methodology be adopted as part of the compliance framework for heavy vehicle telematics, and applied by governments when setting minimum standards for regulatory telematics applications.

40 ALC, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 6
41 ATA, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 4
42 ibid., p. 10
43 Mr Hannifey, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 1
44 ANZPAA, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 3
45 ibid., p. 8
5. Privacy and access to data

Proportionate and reasonable access to personal information for compliance and enforcement purposes is at the centre of the compliance framework for heavy vehicle telematics. The objective of the framework principles seeks to protect operators and drivers from intrusive or unreasonable access to personal information by regulators and enforcement agencies and to ensure governments handle telematics information consistent with the APPs.

Protection of personal information is critical; privacy risks are identified as a barrier for uptake by stakeholders if not appropriately managed. Telematics data amplifies opportunities to cross-match and compare information – governments therefore need to be clear and transparent about the uses of data.

Establishing sound privacy settings also establishes a structure to potentially manage confidential data owned by industry that is not classified as personal information.

5.1 Australian privacy principles

Personal information gathered for enforcement purposes is generally exempt from privacy regimes. Without limiting enforcement capabilities, it is recommended that in a voluntary telematics environment regulators and enforcement agencies should reflect privacy principles in policies and programs that utilise regulatory telematics. The APPs\(^\text{46}\) provide guidance in respect to handling personal information and it is recommended that these privacy principles are reflected in the proposed framework. There are 13 APPs that regulate the collection, handling, disclosure and destruction of personal information:

**APP 1 – Open and transparent management of personal information:** personal information must be openly and transparently managed. Entities holding personal information must have a clearly expressed and up-to-date privacy policy.

**APP 2 – Anonymity and pseudonymity:** individuals must have the option of not identifying themselves, or of using a pseudonym, unless it is impracticable to do so.

**APP 3 – Collection of personal information:** personal information must not be collected unless it is reasonably necessary for, or directly related to, one or more of the entity’s functions or activities.

**APP 4 – Dealing with unsolicited personal information:** outlines how entities must deal with unsolicited personal information.

**APP 5 – Notification of the collection of personal information:** as soon as practicable, the individual must be notified of the collection of personal information, the purpose of the collection, and whether the information will be held overseas.

**APP 6 – Use or disclosure of personal information:** personal information may not be used or disclosed for a secondary purpose without the consent of the individual, or unless it is required by law, or the entity reasonably believes that the information is necessary for law enforcement activities.

**APP 7 – Direct marketing:** an organisation may only use or disclose personal information for direct marketing purposes if certain conditions are met.

**APP 8 – Cross-border disclosure:** before personal information is disclosed overseas, the entity must take reasonable steps to ensure that the overseas entity does not breach the APPs.

**APP 9 – Government-related identifiers:** there are limited circumstances when an entity may adopt a government-related identifier of an individual as its own identifier.

**APP 10 – Quality of personal information:** an entity must take reasonable steps to ensure the personal information it collects is accurate, up to date and complete.

APP 11 – Security of personal information: an entity must take reasonable steps to protect personal information from misuse, interference, loss, unauthorised access, modification or disclosure. An entity has obligations to destroy or de-identify personal information in certain circumstances.

APP 12 – Access to personal information: an entity must provide individuals with access to their personal information, unless the request is unreasonable or access is subject to other regulations.

APP 13 – Correction of personal information: if the entity is satisfied that the information is inaccurate, out of date, incomplete, irrelevant or misleading, the entity is obligated to correct the personal information it holds.

5.2 Privacy-by-design

Adopting a privacy-by-design approach, privacy protections are integrated into the design and build of the system. A privacy-by-design approach should consider information flows, separation of functions and ensuring that personal information is only collected to undertake the relevant task.

It is recommended that a privacy-by-design approach is implemented when developing regulatory telematics systems. Adopting a privacy-by-design approach, privacy protections are integrated into the system rather than mitigated after the design of program is finalised.

The development of a common dataset and TARV standards (discussed at chapter 3) is key to adopting a privacy-by-design approach. A common dataset does not mean that an Authorised Officer can access all telematics data, regardless of the purposes for which it is collected. An integrated approach that bundles regulatory and commercial applications may be siloed so that an Authorised Officer can only access data relevant to the regulatory application. This is illustrated at Figure 4.

Figure 4: Managing the interface between heavy vehicle telematics systems and different compliance and enforcement approaches

![Diagram of managing the interface between telematics systems](image)

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47 National Transport Commission, 2013
This approach will ensure data remains private unless there is a clear enforcement purpose to access the data – and that each regulatory application only collects data relevant to the task. This approach also distinguishes between regulatory data accessed at the roadside, under audit conditions or other enforcement approaches, such as noncompliance reporting. An Authorised Officer at the roadside may be able to access and review EWD records but not IAP records, even though both are utilising a common dataset and a telematics system with both commercial and regulatory functions.

5.3 Surveillance device laws

In addition to privacy principles, governments must be compliant with surveillance device laws in respective jurisdictions. The Surveillance Devices Act 2004 (Cwlth) provides that a tracking device (e.g. telematics that can determine the geographical location of a person) cannot be used for enforcement purposes without a warrant or the subject’s consent, whether express or implied. Similarly, in all state and territories except Queensland, equivalent laws provide that surveillance by any public or private entity requires the subject’s consent.

5.4 Stakeholder feedback

Privacy and management of data access by governments was viewed as a critical requirement of the framework by many stakeholders: ‘it is vital in the roll out of any future telematics … that there is a focus on building and sustaining positive relationships with the industry that builds confidence in the way that telematics data will be utilised, particularly for compliance and enforcement’. There was no disagreement that data gathered for a regulatory purpose should be accessible for enforcement in defined circumstances. The ATA emphasised that data may be accessed from driver devices at the roadside by law enforcement officers as warranted but the purpose and method of collection must be clear. The OAIC supported the introduction of specific privacy principles:

The OAIC strongly supports the inclusion of a principle, as outlined in the Discussion Paper, that requires enforcement agencies that access telematics information to be bound by privacy principles that are consistent with the APPs.

The ALC agreed with this approach and sought to strengthen the privacy principles to the effect that regulators and enforcement agencies must be bound by the APPs. ALC expressed industry concerns regarding government agencies having a general right to access data for undefined government functions. The SAFC sought clearly documented boundaries regarding the treatment of telematics information. Conversely, the ANZPAA submission stated that police consider that privacy is already managed by existing and specific legislation, including authorised use provisions of the HVNL, and do not see a need for further regulation in this area. TMR recognised that information protection requirements need to be built into regulatory telematics applications by design. Often this is not about locking down information, but freeing it for relevant purposes.

The National Road Transport Operators (NatRoad) was concerned that threshold issues remain unaddressed in the framework – namely, that governments must consider what is the acceptable role of surveillance and enforcement technologies in the industry given that technology is potentially intrusive and threatens to profoundly impact on the lifestyles and civil liberties of operators and drivers.

The OAIC supported the inclusion of a framework principle that restricts access to telematics data to purposes intended in the HVNL. TMR, however, observed that there may be circumstances where other agencies, operating under different laws (such as the Environmental Protection Authority), may legitimately seek access to telematics data.

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49 WA Main Roads, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 2
50 ATA, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013 p. 12
51 OAIC, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 3
52 ALC, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 5
53 SAFC, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 1
54 ANZPAA, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 1. Ref to section 729 of the HVNL – authorised use of protected information gathered under the HVNL.
55 TMR, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 1, letter
56 NatRoad, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 2
The OAIC noted that the framework principles seek to allow the aggregation of de-identified telematics data for research and planning purposes but observed the complexities of ensuring data is genuinely de-identified: ‘the risk of de-identified information being re-identified will depend on the nature of the information asset, the de-identification techniques used and the context of the disclosure’. This concern was reiterated informally by other stakeholders, particularly in relation to remote or rarely used roads where it may be easier for personal information to become reasonably identifiable.

5.5 Privacy and access to data: policy position

Certainty of how data will be used, and robust protection of personal information, will be a key outcome of the framework. An appropriate balance between protecting personal information and access to relevant data for compliance and enforcement purposes is sought; the framework will not restrict reasonable access to telematics data for enforcement purposes but provide clarity for all stakeholders as to what data will be accessed by regulators and enforcement agencies, and in what circumstances.

It is noted that the HVNL already provides that protected information can only be used for an authorised use: an authorised use is defined in section 727 of the HVNL and includes use of information by a law enforcement agency for a purpose under the HVNL. The framework principles encapsulate and build on section 729 of the HVNL by ensuring that regulators and enforcement agencies not only access information gathered under HVNL powers for authorised purposes, but that agencies handle, disclose and destroy that information in accordance with the APPs.

Consistent with the Commonwealth requirements for new laws to be assessed for compatibility with human rights, the framework principles seek to ensure the access and use of telematics information is consistent with Australia’s human rights obligations. Compliance with the surveillance device laws – which require all electronic surveillance to be overt – should also safeguard drivers from inappropriate or intrusive surveillance by governments.

When governments have a requirement to access personal information from a telematics system for a reasonable purpose that is necessary to undertake a task, the purpose does not have to be related to the HVNL when stated as a primary purpose of collection. This is in alignment with principle 4 of the framework principles.

The aggregation and sharing of de-identified telematics data provides useful evidence for research and planning purposes. Telematics data that is aggregated and de-identified is not personal information and the privacy principles will not apply.

5.6 Privacy and access to data: final recommendations

The NTC recommends that the regulators and enforcement agencies that access, handle and disclose personal information generated from regulatory telematics should adopt policies and practices consistent with the APPs.

The NTC recommends that regulatory telematics systems, and the institutional environment they operate in, should adopt a privacy-by-design approach to ensure regulatory and commercial systems co-exist; and that regulatory telematics systems only use personal information necessary to undertake the tasks directly related to the entity’s functions.

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57 OAIC, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 3
58 Section 729 of the Heavy Vehicle National Law 2012 (Qld)
6. Mandatory and voluntary options

6.1 Introduction to the issues

A key question in the current regulatory environment is the extent to which telematics should be voluntary. Given that the measurable benefits of telematics are dependent on the particular regulatory application and the related policy settings, the discussion paper proposed that if there is support for mandatory telematics among stakeholders, the question should be considered in relation to meeting an explicit legal obligation under the HVNL or relevant state law, rather than introducing a general obligation at a framework level.

By way of example, a cost-benefit analysis was developed in the EWD Pilot to identify the indicative operational costs and benefits associated with the implementation of the EWD compared with the current written work diary. Critically, this assessment was undertaken within defined policy parameters – namely, in comparison with written work diary practices and based on present roadside enforcement operations and the introduction of a remote access connection framework and compliance assessment software for Authorised Officers.59 A detailed assessment of the costs and benefits of introducing EWDs would not have been possible without reference to these policy settings. Conversely, a general requirement to install telematics outside of any policy settings or regulatory environment would not be the basis for a meaningful assessment of the costs and benefits.

6.1.1 Strategic context for voluntary telematics

In 2012 TISOC initiated the Compliance Framework for Heavy Vehicle Telematics project specifically to encourage the voluntary use of telematics for compliance purposes in the heavy vehicle industry. This was based on a clear direction from the National in-vehicle telematics strategy: the road freight sector, which was endorsed by the Australian transport ministers, wherein principle 5 stated that ‘telematics-based compliance monitoring should be voluntary wherever practical’60 [emphasis in the original].

The 20-year vision described in the strategy was for the voluntary uptake of telematics in the transport sector. The voluntary approach towards adopting heavy vehicle telematics was reiterated in the Policy Framework for ITS, approved by the then Australian Transport Council. Policy principle 2 in the framework provides that the policy environment in which ITS are developed and implemented must be robust and dynamic. The development of national standards and deployment of ITS applications and services under this policy principle shall, among other things, ‘ensure that regulation is only introduced when there is a demonstrated need to do so, is closely targeted, and involves the minimum level of intervention required to deliver a regulatory objective’61.

The strategic environment supports a continued voluntary approach towards adopting telematics by industry at a framework level. Any regulatory intervention must be closely targeted and supported by a robust benefits assessment.

6.1.2 Pre-existing requirements to use telematics

The HVNL provides for a range of non-pecuniary penalties, including court-imposable penalties such as a supervisory intervention order. Section 599 of the HVNL provides that where a conviction has occurred, and that person is (or is likely to become) a systematic or persistent offender, he or she may be subject to a supervisory intervention order that requires prescribed activities to improve compliance with the law. The HVNL specifies that this may include installing ITS to monitor or manage compliance.

In addition to court-imposed penalties, a party that has breached the law could enter into a voluntary agreement as an alternative to litigation. Action 6 of the National in-vehicle telematics strategy: the road freight sector is to establish enforceable voluntary undertakings for the fitting of in-vehicle telematics systems to monitor compliance.62 In such circumstances, once the undertaking is entered into, the use of telematics would not be voluntary.

60 National Transport Commission, National in-vehicle telematics strategy: the road freight sector, 2011, p. 6
There are no known instances of telematics being issued as part of a supervisory intervention order or enforceable voluntary undertaking. However, opportunities to do so are expected to increase with the delivery of the compliance framework for heavy vehicle telematics and the approval of EWDs.

The IAP is a regulatory tool available to jurisdictions to manage access and compliance for a range of vehicle types and circumstances, including oversize and over-mass vehicles. It allows heavy vehicles to have access, or improved access, to the road network in return for electronic monitoring of their compliance with stated access conditions.\(^63\) In the event that an operator seeks to gain access to part of a network with a particular vehicle, IAP is not voluntary.

These are pre-existing requirements to adopt telematics that the framework is not seeking to change.

### 6.2 Stakeholder feedback on mandatory and voluntary options

The ATA, NatRoad, SAFC and WA Main Roads supported a voluntary approach. The ATA argued that mandatory telematics would be intrusive, costly and misdirected and that smaller fleets would be unable to fund technology innovations.\(^64\) While the ATA supported the use of mandatory telematics for supervisory intervention orders for systemic or persistent offenders in exceptional circumstances, a genuinely ‘voluntary telematics approach for enforcement purposes and commercial systems recognition approach to encouraging telematics uptake\(^65\) was emphasised.

The ALC stated that the continued emphasis of telematics as a regulatory solution severely impacts on voluntary uptake. The ALC spoke in favour of mandatory telematics used primarily by operators to record speed and fatigue but would not be accessible by governments for regulatory purposes. The ALC stated that a regulatory impact statement (RIS) would prove that the benefits of mandatory telematics would outweigh the costs and that an RIS should be instigated by ministers.\(^66\)

NSW emphasised that operators will increasingly adopt telematics, regardless of regulatory interventions, because of the safety and productivity assurances to the market afforded by the technology.\(^67\) NSW suggested that mandatory usage would align with approaches in the European Union and United States and would provide certainty and encourage innovation in the industry. Moreover, a number of complex policy issues could be resolved:

> Equity of treatment between users and non-users is a problem that is exacerbated by the principle of voluntary take-up, as it effectively encourages operators to treat commercial advantage as a discrete benefit independent of the regulatory decision … The idea that industry needs compensation for exposing itself to higher probability of detection is not always justifiable.\(^68\)

New South Wales (NSW) further suggested that voluntary uptake, and the policy principles that underpin this approach, be revisited. NSW stated that there was an excessive focus on perceived operator costs considered without reference to the commercial advantages of telematics systems. While NSW agreed that telematics should not be mandated at a framework level, a “holistic benefit-cost appraisal” of mandatory applications on a case by case [basis] (e.g. speed, fatigue, etc) needs to be performed.\(^69\)

TMR stated a preference for voluntary telematics where that approach delivers the same policy outcomes as a mandatory approach. TMR recognised that in a voluntary environment, enforcement action based on telematics data may impact on the uptake of regulatory telematics:

> It should be accepted that some operators may remove themselves from a regulatory telematics scheme following enforcement action triggered through telematics. However, a moderate take up of a voluntary telematics scheme with high compliance in it, is preferable to a high take up with low compliance outcomes.\(^70\)

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\(^63\) Section 401 of the Heavy Vehicle National Law 2012 (Qld)
\(^64\) ATA, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 6
\(^65\) ibid., p. 10
\(^66\) ALC, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 8
\(^67\) NSW, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 1 – table
\(^68\) ibid., pp. 2–3 – table
\(^69\) ibid., p. 6 – table
\(^70\) TMR, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 1
However, it was TMR’s view that mandating telematics should not be ruled out as a principle – ‘such decisions should follow a rigorous regulatory assessment process’.71 VicRoads indicated a similar position and would look for a robust cost-benefit analysis of a specific regulatory application before considering mandatory options.

While supporting a voluntary approach, ROAD to SAFETY Pty Ltd argued that the framework must be able to cater for both voluntary and mandatory approaches. WA Main Roads suggested that if an application is mandated, the NTC should establish a separate framework to deal with the related issues created by a mandated system.

6.3 Mandatory and voluntary options: policy position

Taking into consideration that the measurable benefits of telematics are dependent on the particular regulatory application and the related policy settings, the NTC confirms its position in the discussion paper and proposes that a general framework is not the appropriate mechanism to accurately assess the regulatory impacts of mandatory telematics. Any consideration of mandatory telematics must be underpinned by a robust and compelling cost-benefit analysis and there is insufficient evidence to recommend mandatory telematics generally. The NTC notes the support of governments for this approach and a strong view from parts of industry that regulatory telematics should not be made mandatory. Furthermore, the issues that the compliance framework sets out to address would be required, regardless of whether telematics were mandatory.

The NTC understands the ALC’s position but does not believe there is a valid role for governments to require the use of telematics in all line-haul heavy vehicle operations to generally increase compliance but decoupled from any regulatory function. While telematics that monitor speed and fatigue may provide some operators with ‘the most convenient mechanism [to] maintain the safe operation of the fleet’,72 governments do not seek to intervene in commercial telematics decision making unless it is related to a specific regulatory requirement. To achieve higher levels of telematics uptake among third parties in the transport supply chain, optimising chain of responsibility obligations and commercial contracting arrangements should be further explored by industry.

Any future assessment of mandatory telematics should be undertaken in relation to a specific regulatory application and policy proposal. Proposals to introduce mandatory telematics must be underpinned by a robust and compelling business case and meet the Office of Best Practice Regulation guidelines in relation to the development of RIS.

In the event that a proposal to make a specific regulatory application mandatory is based on a robust and compelling cost-benefit analysis and is accepted by governments, the establishment of the framework will not prevent specific regulatory applications from becoming mandatory at a future time.

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71 TMR, Submission to Developing a Compliance Framework for Heavy Vehicle Telematics, 2013, p. 3
7. Framework principles

The following principles are a culmination of the discussion, stakeholder feedback and policy positions charted in the final policy paper, and represent policy outcomes in relation to privacy, access to data for compliance and enforcement purposes, minimum standards of evidentiary value, regulatory efficiencies and the application of the principles.

To ensure coordinated and nationally consistent deployment of regulatory telematics, and to ensure clear and robust privacy protections facilitate the uptake of telematics within an agreed policy framework, governments and regulators will implement heavy vehicle telematics initiatives, policies and programs in accordance with the following 10 framework principles:

7.1 Privacy and protection of information principles

Principle 1 The access and use of telematics information must be consistent with Australia’s international human rights obligations: public authorities must not apply or enforce laws, policies or programs in a discriminatory or arbitrary manner, and no one must be subjected to arbitrary or unlawful interference with his or her privacy.

Principle 2 When accessing telematics information for compliance and enforcement purposes, public authorities must be bound by privacy and information principles that are consistent with the Australian Privacy Principles – these principles should allow the aggregation of de-identified telematics data for research and planning purposes.

Principle 3 Each regulatory application must clearly identify to the user which organisation has responsibility for personal information generated by the telematics system, and which organisations may access or hold personal information derived from the telematics system.

Principle 4 Information derived from telematics systems must only be accessed by public authorities for the regulatory purposes for which they were intended. For example, a telematics system installed only to meet regulatory requirements under the Heavy Vehicle National Law must not be accessed for any other regulatory, enforcement or investigatory purpose unless a court-issued warrant is obtained.

Privacy and protection of information principles seek to protect operators and drivers from intrusive or unreasonable access to personal information by regulators and enforcement agencies. Framework principles consistently adopted at a national level are necessary given that enforcement activities are largely exempt from the APPs and state and territory Information Privacy Principles.

It is recognised that regulatory applications may co-exist with commercial applications. For example, a telematics system may incorporate an approved EWD and a speed compliance application for driver management purposes. This approach is consistent with the development of a common dataset and the framework principles. Where this is the case, the additional personal information (speed compliance data) would be collected for a necessary commercial purpose and would be consistent with the privacy principles. An Authorised Officer should not be able to access all data generated by a telematics system merely because a regulatory application is integrated into that system.

7.2 Compliance and enforcement principles

Principle 5 Each regulatory policy must set out:
- the purposes for which information will be collected
- which data will be accessed for these purposes
- the conditions under which this information will be sought.

**Principle 6**
Public authorities that use telematics information for a regulatory purpose must develop and implement policies based on reasonable and proportionate enforcement. The treatment of telematics information should have regard to patterns of behaviour and the higher probability of detection.

**Principle 7**
Enforcement policies in relation to the use of telematics information should be publicly released where it is appropriate to do so, and when the release of the enforcement policy does not pose a risk to the integrity of enforcement or regulatory policy.

Telematics systems generate detailed and accurate data that can be transmitted wirelessly to operators, regulators and enforcement agencies. In many regards, telematics technology therefore increases the probability of detecting driver and vehicle breaches. It is critical that drivers are not unfairly targeted because they use regulatory telematics or that regulators and enforcement agencies use telematics to focus on isolated small breaches. Rather, regulatory telematics should provide an increased evidence base to identify patterns of behaviours and to enable regulators and enforcement agencies to develop intelligent, risk-based analyses and to target high levels on noncompliance. In turn, drivers and operators will be able to demonstrate compliant behaviour.

In the longer term, as the intelligent, risk-based analysis and processing of telematics information matures, regulators and enforcement agencies will have opportunities to consider the balance of roadside enforcement and audit-based compliance.

Drivers and operators should have an informed understanding of the enforcement implications of using a regulatory telematics application – publicly available enforcement policies, including where appropriate, the treatment of small breaches, will increase certainty and uptake in the industry and subsequently improve road safety, productivity and environmental performance.

### 7.3 Minimum standards of telematics

**Principle 8**
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.

The level of assurance governments will require of a telematics system, including the performance, integrity and tamper-evident capabilities of the system, is dependent on the policy requirements of the regulatory application and the extent to which the regulatory application is used for enforcement purposes. In line with the assurance methodology (Figure 1) the minimum standards of a telematics system should require a high level of assurance only when the data is explicitly gathered for an enforcement or supervisory intervention purpose, and particularly when the data is used to issue an infringement at the roadside.

Other compliance approaches such as chain of responsibility, audit-based compliance and safety management systems, are not focused on enforcement-based infringements and do not have the same prosecutorial emphasis. In these circumstances, governments should not seek a high level of assurance from the telematics data generated for these alternative purposes. Furthermore, when an operator uses a telematics device for entirely commercial purposes, or to generally increase their compliance, governments do not have a role ascertaining minimum standards for those systems.
7.4 Regulatory efficiencies

**Principle 9** The use of telematics to improve compliance should aim, where possible, to ensure greater safety and efficiency for industry and public authorities.

Regulatory telematics should aim to ensure greater safety and efficiency for both industry and enforcement. The introduction of regulatory telematics should have a net community benefit, taking into consideration reductions in road deaths and serious injury, and increased productivity and operational efficiencies. The discussion paper further identified that regulatory telematics could generate very high returns if used to underpin intelligent, risk-based targeting of high noncompliance and rebalancing roadside enforcement and audit-based compliance approaches.

7.5 Application of these principles

**Principle 10** These principles should be consistently applied to future regulatory telematics by participating public authorities. Public authorities should demonstrate and communicate to stakeholders why a departure from the framework principles is warranted.

Industry seeks consistent treatment of telematics information across regulators and enforcement agencies, which in turn will increase certainty and confidence in telematics and drive uptake. It is fundamental to the establishment of framework principles that jurisdictions proactively ensure the framework is applied to related policies and programs and that jurisdictions are accountable for policies and outcomes that are not consistent with the framework principles.

The IAP is the only regulatory telematics application in use today. Initial analysis indicates that IAP legislation, processes and policies are consistent with the proposed compliance framework.

The NTC has undertaken to support jurisdictions and regulators to ensure relevant projects and programs are consistent with the framework principles.

7.6 Framework principles: final recommendation

The NTC recommends that the framework principles are approved by the Transport and Infrastructure Council and implemented as part of the compliance framework for heavy vehicle telematics.
8. Recommendations

**Recommendation 1:** that the framework be adopted to provide a reference for regulators, enforcement agencies and operators to facilitate better use of telematics to improve responsive regulation, audit-based schemes, safety management systems, chain of responsibility and industry-based schemes.

**Recommendation 2:** that the common dataset, including the data dictionary, is finalised by TCA in consultation with stakeholders and is subsequently approved by the Transport and Infrastructure Council for implementation as part of the compliance framework for heavy vehicle telematics.

**Recommendation 3:** that the minimum standards methodology be adopted as part of the compliance framework for heavy vehicle telematics, and applied by governments when setting minimum standards for regulatory telematics.

**Recommendation 4:** that the regulators and enforcement agencies that access, handle and disclose personal information generated from regulatory telematics should adopt policies and practices consistent with the Australian Privacy Principles.

**Recommendation 5:** that regulatory telematics systems, and the institutional environment they operate in, should adopt a privacy-by-design approach to ensure regulatory and commercial systems co-exist; and that regulatory telematics systems only use personal information necessary to undertake the tasks directly related to the entity’s functions.

**Recommendation 6:** that the framework principles are approved by the Transport and Infrastructure Council and implemented as part of the compliance framework for heavy vehicle telematics.
9. Submissions received

Table 2: Submissions received from the discussion paper

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<thead>
<tr>
<th>Submitter</th>
<th>Description</th>
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<tr>
<td>ROAD to SAFETY Pty Ltd</td>
<td>ROAD to SAFETY Pty Limited</td>
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<td>OAIC</td>
<td>Office of the Australian Information Commissioner</td>
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<td>SAFC</td>
<td>South Australian Freight Council</td>
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<td>TfNSW</td>
<td>Transport for New South Wales</td>
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<td>QLD TMR</td>
<td>Queensland Department of Transport and Main Roads</td>
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<td>ALC</td>
<td>Australian Logistics Council</td>
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<td>ANZPAA</td>
<td>Australia New Zealand Policing Advisory Association</td>
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<td>ATA</td>
<td>Australian Trucking Association</td>
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<td>NatRoad</td>
<td>National Road Transport Operators</td>
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<td>WA Main Roads</td>
<td>Western Australia Main Roads</td>
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<tr>
<td>Mr Hannifey</td>
<td>Rod Hannifey, Road Transport and Road Safety Advocate</td>
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<td>TIC</td>
<td>Truck Industry Council</td>
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Informal feedback was also received from the following organisations:

- VicRoads
- Government of South Australia, Department of Planning, Transport and Infrastructure
- Transport Certification Australia (TCA).
### Glossary

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<thead>
<tr>
<th>Full name</th>
<th>Description</th>
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<tr>
<td>chain of responsibility</td>
<td>A legal concept in the HVNL that places obligations on parties in the transport chain in regulated areas including speeding, fatigue, mass and loading.</td>
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<tr>
<td>common dataset</td>
<td>The establishment of common data requirements for regulatory telematics, based on international standards.</td>
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<tr>
<td>Transport and Infrastructure Council</td>
<td>A council of Commonwealth and state transport and infrastructure ministers under the Council of Australian Governments (COAG)</td>
</tr>
<tr>
<td>data dictionary</td>
<td>An agreed language and format to exchange data – the key component of the common dataset that enables effective exchange of information across interoperable systems.</td>
</tr>
<tr>
<td>electronic work diary (EWD)</td>
<td>In-vehicle electronic device to record the work and rest hours of heavy vehicle drivers. A legal alternative to the written work diary, an EWD system is yet to be approved for use in Australia.</td>
</tr>
<tr>
<td>global navigation satellite system (GNSS)</td>
<td>A navigational system that provides geospatial positioning based on longitudinal, latitudinal and altitudinal data. A GPS is an example of a GNSS.</td>
</tr>
<tr>
<td>Heavy Vehicle National Law (HVNL)</td>
<td>National law operating in all states and territories (except Western Australia and the Northern Territory); includes chain of responsibility, fatigue, EWD and IAP provisions.</td>
</tr>
<tr>
<td>Intelligent Access Program (IAP)</td>
<td>A regulatory program that utilises GNSS technology to monitor heavy vehicles. TCA provides IAP certification and auditing functions.</td>
</tr>
<tr>
<td>meta-regulation</td>
<td>Non-regulatory initiatives that improve compliance and are not led or determined by governments, such as industry schemes.</td>
</tr>
<tr>
<td>National Heavy Vehicle Accreditation Scheme (NHVAS)</td>
<td>Voluntary accreditation scheme administered by the NHVR. It offers mass, maintenance and fatigue management modules to approved heavy vehicle operators.</td>
</tr>
<tr>
<td>National Heavy Vehicle Regulator (NHVR)</td>
<td>Regulatory body established under the HVNL. It is responsible for the NHVAS, performance-based standards and EWDs.</td>
</tr>
<tr>
<td>National Transport Commission (NTC)</td>
<td>An independent statutory body responsible for national regulatory and operational reforms in Australia. Reports to the Transport and Infrastructure Council.</td>
</tr>
<tr>
<td>privacy-by-design</td>
<td>The integration of privacy protections into the design and build of any system that generates or handles personal information. It considers information flows, separation of functions and ensuring that only relevant personal information is collected.</td>
</tr>
<tr>
<td>regulatory telematics</td>
<td>Telematics applications that meet a regulatory requirement or demonstrate (or increase) compliance, as opposed to commercial applications.</td>
</tr>
<tr>
<td>Transport Certification Australia (TCA)</td>
<td>Corporation established by Australian road agencies to provide telematics advice, accreditation and administrator services, including IAP certification and auditing.</td>
</tr>
<tr>
<td>telematics</td>
<td>An in-vehicle device that forms part of a system that captures and sends information electronically.</td>
</tr>
</tbody>
</table>
Appendix: Draft data dictionary

A data dictionary establishes a common understanding of the data to be exchanged. This enables the effective exchange of information across interoperating systems. A data dictionary is the key component of a common dataset and includes a common understanding of the relationships between various pieces of data as well as the data type (e.g. numeric, text and binary).

The data models presented here are constructed using human-readable ASN.1 notation, which is an internationally recognised standard. The data dictionary may then be converted into computer readable formats, as required.

-----------------------------------------------

**Type definition of Generic Vehicle Information module (TARV 15638-5)**

TARVLocalDataTree DEFINITIONS AUTOMATIC TAGS ::= BEGIN

LDTData ::= SEQUENCE
{dataFormatVersion DataFormatVersion,
 messageID MessageIdentifier,
 primeSPID PrimeServiceProviderIdentifier,
 applicationSPAddress ApplicationServiceProviderAddress,
 sessionControlData SessionControlData OPTIONAL,
 vehicleUniqueID VehicleUniqueIdentifier OPTIONAL,
 vehicleClassID VehicleClassIdentification OPTIONAL,
 vin VIN,
 propulsionStorageType PropulsionStorageType,
 time TimeAndTimestamp DEFAULT 0,
 location Location,
 direction DirectionOfTravel,
 ignition Ignition,
 movementSensors OtherMovementSensors,
 driverID DriverIdentification,
 trailerID TrailerIdentification OPTIONAL,
 loadData LoadData
}

DataFormatVersion ::= VisibleString (SIZE (6))
MessageIdentifier ::= INTEGER
PrimeServiceProviderIdentifier ::= VisibleString (PATTERN "\w\d:\w\d:\w\d:\w\d:\w\d:\w\d:\w\d") --IPv6 address in the format
ApplicationServiceProviderAddress ::= CHOICE {
 content [0] INTEGER (128..16511), --contained in two octets
 extension [1] OCTET STRING(SIZE (2))
}

SessionControlData ::= VisibleString
VehicleUniqueIdentifier ::= SEQUENCE {
countryCode VisibleString,
alphabetIndicator VisibleString,
licPlateNumber NumericString
}

VehicleClassIdentification ::= NumericString (SIZE (2))
VIN ::= VisibleString (SIZE (17))
PropulsionStorageType ::= BIT STRING {
gasoline (0),
diesel (1),
cng (2),
lpg (3),
electric (4),

73 Transport Certification Australia, 2013.
hydrogen (5)
} --Enter type value with curly bracket at beginning and end, assignment type will accept word and binary forms of storage type

TimeAndTimestamp ::= INTEGER
Location ::= SEQUENCE {
    latitude VisibleString (SIZE (10)),
    longitude VisibleString (SIZE (10)),
    altitude VisibleString (SIZE (4..5)) DEFAULT "0000",
    noOfSats VisibleString (PATTERN "Sat\d+"), --Type value must be in the format \"Sat\d\n\ntrust INTEGER {
    false (0),
    true (1)
} (0 | 1) --accepts true, false, 0 or 1
}

DirectionOfTravel ::= INTEGER (0..359) --degrees clockwise
Ignition ::= VisibleString ("Ign 1" | "Ign 0" | "Ign d") --where 1=on, 0=off, d=disconnected
OtherMovementSensors ::= SEQUENCE {
    sensorOne VisibleString (PATTERN \"\d+s\Mvt\s(m,n,d)\"|"000") DEFAULT "000", --Type value must be in the format \"[SensorNumber] Mvt [m/n/d]\", where m=movement, n=no movement, d=disconnected
    sensorTwo VisibleString (PATTERN \"\d+s\Mvt\s(m,n,d)\"|"000") DEFAULT "000"
}

DriverIdentification ::= SEQUENCE {
    jurisdictionID VisibleString (PATTERN \"\d#6\s\w+s\s\w+\s\w+\s\w+\s\w+\s\w+\s\w+\s\w+\s\w+\s\w+\d#6\"), --Must be in the format \"[IssueDate(yymmdd)] [IssuingJurisdiction] [Driver'sName] [VehicleClasses(comma separated)] [ExpiryDate(yymmdd)]\"
    userAuthorisation VisibleString (PATTERN \"\d#6\s\w+s\s\w+\s\w+\s\w+\s\w+\s\w+\s\w+\s\w+\s\w+\s\w+\d#6\") DEFAULT "000000" --Same format as jurisdictionID
}

TrailerIdentification ::= VisibleString
LoadData ::= VisibleString
END

Type definition of Vehicle Access Management model (TARV 15638-8)

VehicleAccessManagement DEFINITIONS AUTOMATIC TAGS ::= BEGIN IMPORTS LDTData FROM TARVLocalDataTree;
VAMData ::= SEQUENCE {
    vAM001 LDTData,
    vAM002 CoreData,
    vAM003 Uref,
    vAM004 ReqDes
}

CoreData ::= SEQUENCE {
    ipv6DestinationAddress VisibleString (PATTERN \"\w#4:\w#4:\w#4:\w#4:\w#4:\w#4:\w#4:\w#4\"),
    essentialVehicleData LDTData,
    appData AdditionalDataOptions
}

AdditionalDataOptions ::= SEQUENCE {
    accelerometer AccelerometerData OPTIONAL,
    gyroscope GyroscopeData OPTIONAL,
    stillCamData BIT STRING OPTIONAL,
    videoData BIT STRING OPTIONAL,
    speed VehicleSpeedData OPTIONAL,
    alarm AlarmStatusData OPTIONAL
}
AccelerometerData ::= SEQUENCE
  {x-axis VisibleString (PATTERN "\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\")},
  {y-axis VisibleString (PATTERN "\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\")},
  {z-axis VisibleString (PATTERN "\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\")},
  sync VisibleString (PATTERN "\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\\s\\w#4\")
}

GyroscopeData ::= SEQUENCE
  {angularRateX BIT STRING (SIZE (10))},
  {angularRateY BIT STRING (SIZE (10))},
  {angularRateZ BIT STRING (SIZE (10))},
  {accelerationX BIT STRING (SIZE (10))},
  {accelerationY BIT STRING (SIZE (10))},
  {accelerationZ BIT STRING (SIZE (10))}

VehicleSpeedData ::= SEQUENCE
  {serialNumber VisibleString (PATTERN "s0\d#3"),
   --e.g. s0123
   timeStamp NumericString (SIZE (6)),
   --e.g. 110316
   unit VisibleString ("k"|"m"),
   --e.g. k
   speed INTEGER (0..400),
   --e.g. 53
   latitude VisibleString (SIZE (10)),
   --e.g. 0x0A5D3770
   longitude VisibleString (SIZE (10)),
   --e.g. 0x027E2938
   direction INTEGER (0..358)
   --e.g. 123}

AlarmStatusData ::= SEQUENCE
  {recordNumber VisibleString (PATTERN "A0\d#4"),
   dateTime INTEGER,
   alarmCode VisibleString (PATTERN "A\d#(1,2)")
}

Uref ::= VisibleString (SIZE (8))
ReqDes ::= VisibleString (SIZE (35))
END

--------------------------------------------------------------------

Type definition for driver work records (TARV 15638-11)

TARVDriverWorkRecords DEFINITIONS AUTOMATIC TAGS ::= BEGIN

  DWRData ::= SEQUENCE
    {wRE001 DWRID,
     wRE002 RecordType,
     wRE003 SpecVersionNumber,
     wRE004 Date, --Date in UTC
     wRE005 TimeOfDeclaration, --Time in UTC
     wRE006 UTCOffset,
     wRE007 IVSID,
     wRE008 RecordNumber,
     wRE009 DriversLicenceNumber,
     wRE010 DriversLicenceIssuingJurisdiction,
     wRE011 DriversName,
     wRE012 DriversBaseJurisdiction,
     wRE013 DriversBaseAddress,
     wRE014 DriversBaseLatitude,
     wRE015 DriversBaseLongitude,
     wRE016 WorkHoursOption,
     wRE017 AccreditationDetail OPTIONAL,
     wRE018 RecordKeeperAddress,
     wRE019 RecordKeeperAddressJurisdiction,
     wRE020 MassStorageDeviceSerialNumber OPTIONAL,
     wRE021 WorkRestStatus,
     wRE022 DWRUsage,
     wRE023 OdometerReading, --Odometer reading at the time of declaration
     wRE024 DistanceTravelled,
     wRE025 RegistrationNumber, --Registration number of the heavy vehicle
wRE026 RegistrationJurisdiction, --Registration jurisdiction of the heavy vehicle
wRE027 MultipleDriverArrangementStatus,
wRE028 AccompanyingDriversLicenceNumber OPTIONAL,
wRE029 AccompanyingDriversLicenceIssuingJurisdiction OPTIONAL,
wRE030 AccompanyingDriversName OPTIONAL,
wRE031 AccompanyingDriversDWRID OPTIONAL,
wRE032 AccompanyingDriversDWRIssuingJurisdiction OPTIONAL,
wRE033 DescriptionOfDeclarationPosition,
wRE034 LocationState,
wRE035 DeclarationPositionLatitude,
wRE036 DeclarationPositionLongitude,
wRE037 DateOfLastKnownNonVoidPosition,
wRE038 TimeOfLastKnownNonVoidPosition,
wRE039 LastKnownNonVoidPositionLatitude,
wRE040 LastKnownNonVoidPositionLongitude,
wRE041 NumberOfSatellites,
wRE042 HDOP,
wRE043 CommentText OPTIONAL

DWRID ::= VisibleString (SIZE(0..20))
RecordType ::= BOOLEAN --Where TRUE='DWR Activity', FALSE='DWR Challenged'
SpecVersionNumber ::= VisibleString (PATTERN "d#1.d#2") --Type value of the Specification Version Number must be in the format x.xx, where x is an integer, e.g. "0.01"
Date ::= NumericString (SIZE (8)) --YYYYMMDD
TimeOfDeclaration ::= NumericString (SIZE (6)) --HHMMSS
UTCoffset ::= VisibleString (PATTERN "(s|\[|\-|\])#(,1)d#(1,2).d#5") --e.g. "+1000" for UTC+10:00, or "-0930" for UTC-9:30
IVSID ::= VisibleString (SIZE (12))
RecordNumber ::= NumericString (SIZE (10))
DriversLicenceNumber ::= VisibleString (SIZE (0..20))
DriversLicenceIssuingJurisdiction ::= VisibleString (SIZE (3))
DriversName ::= VisibleString (SIZE (0..40))
DriversBaseJurisdiction ::= NumericString (SIZE (6))
DriversBaseAddress ::= VisibleString (SIZE (0..40))
DriversBaseLatitude ::= VisibleString (PATTERN "(s|\[|\-|\])#(1,1)d#(1,2).d#5")
--e.g. "-12.34567"
DriversBaseLongitude ::= VisibleString (PATTERN "(s|\[|\-|\])#(1,1)d#(1,3).d#5")
--e.g. "-123.45678"
WorkHoursOption ::= VisibleString (SIZE (3))
AccreditationDetail ::= VisibleString (SIZE (0..8))
RecordKeeperAddress ::= VisibleString (SIZE (0..40))
RecordKeeperAddressJurisdiction ::= NumericString (SIZE (6))
MassStorageDeviceSerialNumber ::= VisibleString (SIZE (0..10))
WorkRestStatus ::= BOOLEAN --Where TRUE=Work, FALSE=Rest
DWRUsage ::= BIT STRING (SIZE (2)) --Where 00=Maintaining DWR, 01=Changing to WWD, 10=Changing to local work, 11=Discontinuing the use of the vehicle
OdometerReading ::= NumericString (PATTERN "[1|2]\d#7")
DistanceTravelled ::= NumericString (PATTERN "[1|2]\d#7")
RegistrationNumber ::= VisibleString (SIZE (0..8))
RegistrationJurisdiction ::= NumericString (SIZE (6))
MultipleDriverArrangementStatus ::= BOOLEAN --Where TRUE=multiple drivers,
FALSE=single driver
AccompanyingDriversLicenceNumber ::= VisibleString (SIZE (0..20))
AccompanyingDriversLicenceIssuingJurisdiction ::= NumericString (SIZE (6))
AccompanyingDriversName ::= VisibleString (SIZE (0..40))
AccompanyingDriversDWRID ::= VisibleString (SIZE (0..20))
AccompanyingDriversDWRIssuingJurisdiction ::= NumericString (SIZE (6))
DescriptionOfDeclarationPosition ::= VisibleString (SIZE (40))
LocationState ::= NumericString (SIZE (6))
DeclarationPositionLatitude ::= VisibleString (PATTERN "(s|\[|\-|\])#(1,1)d#(1,2).d#5")
--e.g. "-12.34567"
DeclarationPositionLongitude ::= VisibleString (PATTERN "(s|\[|\-|\])#(1,1)d#(1,3).d#5")
--e.g. "-123.45678"
DateOfLastKnownNonVoidPosition ::= NumericString (SIZE (8)) --YYYYMMDD
TimeOfLastKnownNonVoidPosition ::= NumericString (SIZE (6)) --HHMMSS
LastKnownNonVoidPositionLatitude ::= VisibleString (PATTERN "(s|\[|\-|\])#(1,1)d#(1,2).d#5")
--e.g. "-12.34567"
LastKnownNonVoidPositionLongitude ::= VisibleString (PATTERN "(\s|\([\-]|\)\])\((1,1)\(1,3)\(\d\#5\)\)\(=\)\(e.g. \"-123.45678\"
NumberOfSatellites ::= NumericString (SIZE (2))
HDOP ::= VisibleString (PATTERN "\d\#1\d")
CommentText ::= VisibleString (SIZE (0..160))

--------------------------------------------------------------------

Type definition for vehicle 'mass' monitoring module (TARV 15638-12)

VehicleMassMonitoring DEFINITIONS AUTOMATIC TAGS ::= BEGIN
IMPORTS LDTData, Location FROM TARVLocalDataTree;

VMMData ::= SEQUENCE
{vMM001 IVSID,
vMM002 Location, --Vehicle location as per TARV LDT
vMM003 VehicleLoad,
vMM004 MassData,
vMM005 IVSID,
vMM006 Uref,
vMM007 ReqDes }

IVSID ::= VisibleString (SIZE (9))
VehicleLoad ::= VisibleString
MassData ::= SEQUENCE
{recordNumber INTEGER (0..999999),
axleGroupID VisibleString (SIZE (3)),
axleGroupConfiguration VisibleString (SIZE (2)),
axleGroupMass NumericString (SIZE (5)),
grossCombinationMass NumericString (SIZE (5)),
tarvldt LDTData }

Uref ::= VisibleString (SIZE (8))
ReqDes ::= VisibleString (SIZE (35))
END

--------------------------------------------------------------------

Type definition of Vehicle access control module (TARV 15638-14)

VehicleAccessControl DEFINITIONS AUTOMATIC TAGS ::= BEGIN

VACData ::= SEQUENCE
{vAC001 Uref,
vAC002 ReqDes }

Uref ::= VisibleString (SIZE (8))
ReqDes ::= VisibleString (SIZE (35))
END

--------------------------------------------------------------------

Type definition of Vehicle location monitoring module (TARV 15638-15)

VehicleLocationMonitoring DEFINITIONS AUTOMATIC TAGS ::= BEGIN

IMPORTS Location FROM TARVLocalDataTree;
VLMData ::= SEQUENCE
{vLM001 IVSID,
vLM002 Location,
vLM005 NewLocation,
vLM003 Uref,
vLM004 ReqDes}

IVSID ::= VisibleString (SIZE (9))
NewLocation ::= SEQUENCE {
    latitude VisibleString (SIZE (10)),
    longitude VisibleString (SIZE (10)),
    altitude VisibleString (SIZE (4..5)) DEFAULT "0000",
    noOfSats VisibleString (PATTERN "Sat\d+"), --Type value must be in the format "SatN", where N = the number of satellites present
    trust INTEGER {
        false (0),
        true (1)
    } (0 | 1) --accepts true, false, 0 or 1
}

Uref ::= VisibleString (SIZE (8))
ReqDes ::= VisibleString (SIZE (35))

END

--------------------------------------------------------------------

Type definition of Vehicle speed monitoring module (TARV 15638-16)

VehicleSpeedMonitoring DEFINITIONS AUTOMATIC TAGS ::= BEGIN

IMPORTS LDTData FROM TARVLocalDataTree;
VSMData ::= SEQUENCE {
    vSM001 IVSID,
    vSM002 VehicleSpeedData,
    vSM003 IVSID,
    vDSM004 Uref,
    vDSM005 ReqDes,
    vDSMI001 IVSID,
    vDSMI002 VehicleSpeedData,
    vDSMI003 LDTData,
    vDSMI004 Uref,
    vDSMI005 ReqDes
}

IVSID ::= VisibleString (SIZE (9))
VehicleSpeedData ::= SEQUENCE {
    serialNumber VisibleString (PATTERN "s0\d#3"),
    timeStamp NumericString (SIZE (6)),
    unit VisibleString ("k"|"m"),
    speed INTEGER (0..400),
    latitude VisibleString (SIZE (10)),
    longitude VisibleString (SIZE (10)),
    direction INTEGER (0..359)
}

Uref ::= VisibleString (SIZE (8))
ReqDes ::= VisibleString (SIZE (35))

END

--------------------------------------------------------------------

Type definition of Consignment and location monitoring module (TARV 15638-17)

ConsignmentAndLocationMonitoring DEFINITIONS AUTOMATIC TAGS ::= BEGIN
IMPORTS Location FROM TARVLocalDataTree;
CLMData ::= SEQUENCE
{cLM001 IVSID,
cLM002 Location, --Vehicle location as per TARV LDT
cLM003 VehicleConsignment,
cLM004 IVSID,
cLM005 Uref,
cLM006 ReqDes
}
IVSID ::= VisibleString (SIZE (9))
VehicleConsignement ::= VisibleString
Uref ::= VisibleString (SIZE (8))
ReqDes ::= VisibleString (SIZE (35))
END

-------------------------------------------------------------