Submission No 36

INQUIRY INTO HEAVY VEHICLE SAFETY AND USE OF TECHNOLOGY TO IMPROVE ROAD SAFETY

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28 February 2018

Mr G Alpin MP
Chair
Staysafe (Joint Standing Committee on Road Safety)
Parliament of New South Wales
6 Macquarie Street
SYDNEY NSW 2000

Dear Mr Alpin

STAYSAFE INQUIRY INTO HEAVY VEHICLE SAFETY AND USE OF TECHNOLOGY TO IMPROVE ROAD SAFETY – SUBMISSION FROM TRANSPORT CERTIFICATION AUSTRALIA (TCA)

I am writing to present you with TCA's submission to the above-mentioned inquiry.

With reference to the inquiry's terms of reference, our submission is intended to highlight:

- How telematics and related intelligent technologies can improve road safety
- The investments made by govermment and industry over the last decade, which allow road safety intiaitives to be activated immediately through the *National Telematics Framework*, without incurring significant additional costs – or importantly, the need to install new equipment in heavy vehicles.

TCA's submission also includes information on:

- Opportunties to improve heavy vehicle safety through the use of telematics and other intelligent technologies
- How TCA has worked with the NSW Government
- An overview of TCA's work in other jurisdictions
- TCA's work on Connected and Automated Vehicles (CAVs).

In my view, the potential road safety benefits which can be derived from the use of telematics are yet to be fully realised.

I thank you for proving TCA with an opportunity to present a submission

I would be pleased to meet with the Committee to discuss any aspect of our submission, and how TCA can contribute to improved road safety outcomes with the NSW Government and community.

I can be contacted directly on [redacted] Alternatively, the Chief Executive Officer of TCA, Mr Chris Koniditsiotis, can be contacted on [redacted]

Yours sincerely

[redacted]

Stephen Golding, AM, RFD
Chairperson
Transport Certification Australia

CC: Mr Bernard Carlon, Executive Director, NSW Centre for Road Safety
The Hon Melinda Pavey MP, Minister for Roads, Maritime and Freight

Attachment : TCA Submission to the Staysafe inquiry into heavy vehicle safety and use of technology to improve road safety

Inquiry into Heavy Vehicle Safety and Use of Technology to Improve Road Safety

TCA Submission

February 2018

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1 KEY POINTS AND OVERVIEW

1.1 Introduction

TCA is pleased to be given the opportunity to make a submission to the *inquiry into heavy vehicle safety and use of technology to improve road safety*, which is being led by the Joint Standing Committee on Road Safety (Staysafe Committee).

TCA's submission consists of six parts, with the following headings:

i. Key points and overview (this section)

ii. Opportunities to improve heavy vehicle safety through the use of telematics and other intelligent technologies

iii. How TCA has worked with the NSW Government

iv. TCA's work in other jurisdictions

v. TCA's work on Connected and Automated Vehicles (CAVs)

vi. About TCA.

The purpose of TCA's submission is as follows:

i. To highlight how telematics and related intelligent technologies can improve road safety, with relate to the following two items of the inquiry's terms of reference:

a. The management of heavy vehicle driver fatigue and other safety risks through in-vehicle technologies, including benefits, costs, availability and adoption by industry

b. The development of connected and automated vehicle technologies specific for the heavy vehicle industry and opportunities for further development in this space.

ii. To highlight the investments made by government and industry over the last decade allow road safety initiatives to be activated immediately, without incurring significant additional costs – or importantly, the need to install new equipment in heavy vehicles.

TCA welcomes the opportunity to discuss the matters included in this paper with Committee members.

1.2 Background

TCA is the national government body responsible for providing assurance in the use of telematics and related intelligent technologies.

TCA was established in 2005 to deliver nationally consistent outcomes in the use of telematics devices, services and applications.

TCA's Members are the road and transport agencies representing each State and Territory Government, and the Australian Government. In New South Wales, TCA's Member is Roads and Maritime Services (RMS).

TCA is governed by a Board of Directors, consisting of senior representatives appointed by each Member.

Mr Bernard Carlon, Executive Director, Centre for Road Safety, Transport for NSW (TfNSW), is the New South Wales representative on the TCA Board.

1.3 What is telematics?

The term 'telematics' refers to integrated systems of information, communications and sensors to exchange data and information between vehicles and other locations, including:

- Vehicle to infrastructure (V2I) applications
- Vehicle to vehicle (V2V) applications
- Vehicle to elsewhere (V2X) applications.

In other words, telematics involves the communication of data and information between vehicles and other locations.

For the sake of clarity, telematics *does not* extend to other safety technologies (such as electronic stability control, electronic braking systems etc.) which are not designed to collect and communicate data to other locations.

Telematics is now being widely used across surface-based transport – and in particular heavy vehicles – to improve safety, productivity and efficiency outcomes.

1.4 TCA's role and function

Australian Governments increasingly depend on the use of telematics and related intelligent technologies to deliver safety outcomes across surface transport modes[1].

TCA is responsible for managing the *National Telematics Framework* – a digital business platform with infrastructure and rules which supports an open technology market of suppliers/providers of systems and services.

***Because of the platform, and the investments made by governments and industry over the last decade, governments can activate safety initiatives at marginal cost*.**

The Framework operates in a similar manner to other frameworks in other portfolios, as highlighted in the following table:

Portfolio/policy area	Framework	Administrator
Superannuation	Superannuation Prudential Framework	Australian Prudential Regulation Authority (APRA)
Telecommunications/ spectrum management	Spectrum licensing technical framework	Australian Communications and Media Authority (ACMA)
Energy	National Energy Framework	Australian Energy Regulator (AER)
Telematics	National Telematics Framework	Transport Certification Australia (TCA)

[1] TCA's Strategic Plan, and the objects contained within TCA's Constitution and Memorandum of Understanding (MoU) were updated by its Members during 2016 and reflect TCA positioning itself across surface transport modes.

In 2012 the *National Telematics Framework* was recognised internationally through ISO15638: Framework for collaborative **T**elematics **A**pplications for **R**egulated commercial freight **V**ehicles (**TARV**).

The *National Telematics Framework* gives practical effect to the principles of the Policy Framework for Intelligent Transport Systems in Australia[2].

1.5 How telematics can improve road safety outcomes

Telematics and related intelligent technologies enable conformance with laws and regulations which may relate to a specific, or a combination of, the following policy areas:

- Road safety
- Heavy vehicle management
- Public transport management
- Taxis, hire cars and ride sharing
- Waste transport
- Occupational Health and Safety
- Connected and automated vehicles.

TCA administers, facilitates and oversights a growing range of applications – with different levels of assurance dependent upon policy and end-use requirements – that provide data for regulatory purposes through the *National Telematics Framework*.

1.6 An Open Technology Market

The *National Telematics Framework* promotes an open market of telematics providers, offering competition and choice to end-users.

The Framework provides a level playing field that ensures:

- All technology providers are treated equally and transparently
- Functional and technical requirements for regulatory telematics applications are met by all service providers, without inhibiting the ability of providers to differentiate themselves in the market by innovating and competing on price, technology and commercial services
- An open technology market of type-approved hardware and systems, and certified services
- Technical, commercial and operational barriers to entry (or proprietary lock-ins) are minimised.

1.7 The heavy vehicle industry has led the adoption of telematics

There has been widespread adoption of telematics across many sectors of the heavy vehicle industry to improve road safety outcomes.

Since 2014 there has been a 55% increase in the number of heavy vehicles fitted with approved devices which can meet the requirements set by Australian governments (through the *National Telematics Framework*).

As at October 2017, there were 38,779 heavy vehicles (most being articulated vehicles) fitted with in-vehicle hardware (consisting of 66 different device types) capable of supporting all telematics applications administered through the *National Telematics Framework*.[3]

[2] See: https://tca.gov.au/ntf/its-framework

[3] See: http://tca.gov.au/documents/2016-17_TCA_Annual-Report.pdf

This means that around half of the articulated heavy vehicle fleet in Australia is already fitted with devices that can support applications managed through the National Telematics Framework to improve road safety.

1.8 Take away messages

Governments have made investments in the *National Telematics Framework* 'platform' over the last decade to encourage the take-up of telematics.

The heavy vehicle industry has responded adopting telematics systems in significant numbers, which has been influenced by the availability of the Framework.

This investment means that policy makers can activate new safety-based policies and initiatives without:

- Governments needing to develop 'bottom-up' or 'stand-alone technical solutions
- Incurring unnecessary investments and expenditure of public funds
- Forcing additional, unnecessary costs onto transport operators (and other stakeholders).

There are no costs to governments in utilising the applications available through the *National Telematics Framework.* Furthermore, new applications (to meet specific road safety challenges) can be developed and activated at marginal cost.

The following initiatives can be actioned immediately by TCA, in conjunction with the NSW Government, to improve heavy vehicle safety on New South Wales roads:

- **Adopt the immediate use of the *Intelligent Speed Management (ISM)* application across the heavy vehicle industry – to improve safety and compliance management by using GPS to accurately measure speed (see p.10)**
- **Expand the use of the *Intelligent Speed Compliance (ISC)* application – so that vehicles can be monitored for speed, with electronic reporting of over-speed events to operators, drivers and/or road agencies and regulators (if required) (see p.9)**
- **Obtain data from RMS for use in the *Traveller Information Exchange* (in conjunction with data from other sources) – so that heavy vehicle operators and drivers can obtain live information though telematics devices, including rest area availability and occupancy information (see p.11)**
- **Obtain road attribute data from RMS for use in the *Route Guidance application* – so that drivers can be offered turn-by-turn directions to stay on approved roads in New South Wales (and avoid restricted areas which pose a safety risk) (see p.11).**

2 OPPORTUNITIES TO IMPROVE HEAVY VEHICLE SAFETY THROUGH THE USE OF TELEMATICS AND OTHER INTELLIGENT TECHNOLOGIES

2.1 Introduction

TCA acknowledges the NSW Government's road safety plan – *Towards Zero Road Safety Plan 2021*.

The plan recognises that "Vehicle safety technologies that help prevent us from crashing are becoming more widely available" and pledges to:

- Partner with the heavy vehicle industry to enhance protection of fleet safety into heavy vehicle access policy
- Work to deliver supporting road and regulatory conditions for new technology
- Work with the Australian Government to fast-track the adoption of new technologies into vehicle standards, including for commercial and heavy vehicles
- Continue to deliver and refine the current programs improving vehicle safety and equipment safety through supporting the Cooperative Intelligent Transport Initiative which enable us to build research understanding and trial fatigue and distraction monitoring and crash avoidance technologies.
- Build a safety culture and improve safety through partnerships by developing a new heavy vehicle safety strategy and partnerships with the heavy vehicle industry, including champions of change, to improve safety of the freight task across NSW. [4]

The widespread use of telematics, coupled with the availability of applications administered through the National Telematics Framework, can immediately contribute to *Towards Zero Road Safety Plan 2021*.

2.2 Applications available through the National Telematics Framework

TCA administers, facilitates and oversights a variety of telematics applications that provide data for regulatory purposes.

These applications are available for use by TCA's Members (and the heavy vehicle industry).

In making these applications available, TCA's Members (i.e. road and transport agencies, and regulators) retain autonomy over policy and program decisions in using these telematics applications to deliver public outcomes.

Whenever governments activate a new regulatory telematics application, demand is created from end-users. This demand is satisfied by the supply of technologies, devices and services offered by the open technology market

Technology providers can readily support new regulatory (and non-regulatory) telematics applications – by leveraging the National Telematics Framework 'platform' – than would otherwise be possible with traditional, stand-alone technology approaches.

The following outlines telematics applications available through the *National Telematics Framework* that can deliver the objectives of the *Towards Zero Road Safety Plan 2021*:

- Intelligent Access Program (IAP) application
- Intelligent Speed Compliance (ISC) application – *including enhancements to ISC*

[4] See: http://www.towardszero.nsw.gov.au/roadsafetyplan

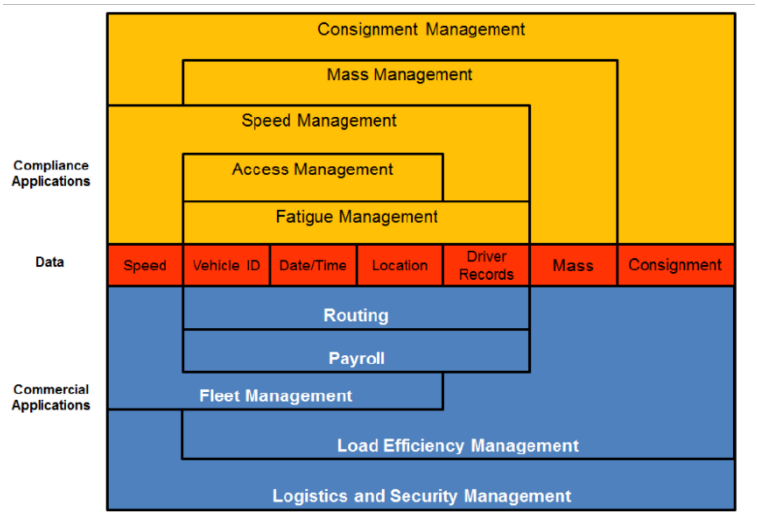
- Intelligent Speed Management (ISM) application
- On-Board Mass (OBM) application
- Route Guidance application
- In-vehicle connectivity application
- Traveller Information Exchange
- Real-time alerts application.

Each application is underpinned by common:

- Data elements (consistent with the telematics data dictionary, as depicted in the diagram below)
- Communication protocols
- Security
- Legal agreements between TCA, certified service providers and transport operators
- Hardware requirements for in-vehicle devices and systems.

It is important to note that, because of these common elements, each of the applications available through the *National Telematics Framework* can now be used by nearly 40,000 prime movers already fitted with telematics devices recognised through the *National Telematics Framework*. (Noting that 40,000 prime movers represent around half of the articulated heavy vehicle fleet in Australia, there are no costs to transport operators (or government) to activate and utilise these applications).

This is the benefit of the investments made by government and industry over the last decade in the *National Telematics Framework* 'platform'. This represents a similar platform approach to the way smartphone 'apps' are supported on a common platform, allowing apps to be activated and deactivated on an individual's phone.



2.3 Levels of Assurance

All applications available through the National Telematics Framework are established by government and private sector entities and designed to meet to the level of assurance sought by these government and/or private sector entities.

The level of assurance provided is set by identifying the level of risk being managed, the management of incentives/disincentives, the benefits sought.

2.4 Intelligent Access Program (IAP)

The IAP is a certified telematics application which ensures 'the right truck is on the right road, at the right time'.

The IAP is a certified telematics application oversighted by TCA.

Heavy vehicle operators can obtain the IAP from an open market of certified service providers.

Road agencies and regulators apply the IAP as a condition of access for specific types of loads and/or vehicle types.

According to RMS:

> *IAP provides restricted access and over dimension/mass vehicles with improved access to NSW's road network. In return, their compliance with approved access conditions is monitored using satellite-based tracking technology. This provides Roads and Maritime Services and the community with greater assurance that the right heavy vehicles are operating on the right roads.*

A national productivity and safety reform

In May 2008, the former Australian Transport Council (ATC) agreed that the IAP be seen as 'a preferred compliance and vehicle management solution and that jurisdictions consider a positive approach to timetabling IAP applications where it could assist improving safety, transport services and asset management with respect to heavy vehicle operations, including bus services'.

The ATC also noted that the jurisdictions established the IAP as a compliance 'tool' to provide greater compliance assurance in relation to the road freight sector for use as appropriate.

At its November 2008 meeting, the ATC called for the development of an Australian performance-based specification for electronic heavy vehicle speed and driver fatigue systems, enhancing the use of in-vehicle telematics and adding value to the Intelligent Access Program (IAP).

This directive has led to the development of a national, performance-based specification and operating environment for Electronic Work Diaries (EWDs), which draws upon core elements of the IAP, tailored to address the policy challenges of driver fatigue and heavy vehicle speed.

This led to the *Operational Pilot of Electronic Work Diaries (EWD) and Speed Monitoring Systems (SMS)*, which was managed jointly between the NSW Government and TCA (see Section 3.1 of this document).

Use of the IAP in New South Wales

The NSW Government has used the IAP to manage road access conditions for specific vehicle loads and/or configurations in New South Wales.

The IAP enables controlled access to the road network:

- Vehicles operating at Higher Mass Limits (HML) (including quad axle group combinations)
- B-triple and AB-triple combinations
- Modular B-triples operating at General Mass Limits (GML) on and east of the Newell Highway or operating at HML
- Vehicles operating under Performance Based Standards (PBS) Access Level 2B or above
- Vehicles operating under the Safety, Productivity & Environment Construction Scheme (SPECTS)
- High risk mobile cranes.

As at the end of January 2018, there were a total of 4,475 vehicles were monitored in the IAP throughout Australia.

Of these, there were 2,928 vehicles monitored in the IAP in NSW – more than any other jurisdiction.

(It should be noted that IAP-monitored vehicles from other jurisdictions are monitored if they travel on New South Wales roads – regardless of whether vehicles are monitored against specific road access entitlements set by RMS. This means that insights into the safe operation of vehicles can be derived from data derived from a larger population of vehicles than the 2,928 vehicles monitored against a New South Wales-specific access entitlement).

Managing compliance through the IAP

TCA's Members rely on the data collected through the IAP to manage compliance and enforcement activities for non-compliant activity recorded through the IAP.

A submission from TfNSW to the National Transport Commission (NTC) in 2013 stated:

> *The application of the IAP to these vehicles is to ensure they only travel on roads assessed as suitable and hence approved for their configuration, providing greater compliance assurance to RMS, other road managers and the wider community to sustainably manage the state's road assets and road safety.*[5]

Similarly, in 2014 TfNSW claimed:

> *Transport for NSW considers that the collection and publication of data relating to safety compliance, payload and route information will allow transport agencies to develop safer and more productive transport systems for the heavy vehicle industry.*[6]

Road agencies have reported that the IAP has been an effective compliance tool. The program has effectively reduced reported non-compliance among participating vehicles through education and communication rather than a traditional enforcement approach. Furthermore, the IAP has provided road authorities with the assurance that the right vehicle is operating on the approved network. Road authorities have indicated that the IAP has enabled controlled access for higher productivity vehicles on the road network. Channelling high risk and heavy vehicles to appropriate routes has reduced the impact of heavy vehicles on the local community, other road users and the environment.[7]

There is a widespread understanding that IAP-monitored vehicles generate electronic exception-based reports (which are received by RMS) which can be used to execute a range of constructive compliance measures (including prosecutions).

During the 2016-17 financial year, TCA issued 18 sets of certificates of evidence, which enabled IAP records to be used as prima facie evidence that offences has been recorded. The majority of these certificates were prepared on behalf of RMS, to progress court action against transport operators found to be non-compliant with road transport law through the IAP.

Opportunities to expand the use of the IAP

The use of the IAP by governments to manage productivity and safety has not been adopted as widely as originally anticipated.

In referencing the Regulatory Impact Statement (RIS) developed by the NTC for the IAP in 2005, TCA's submission to the NTC Review of the IAP in 2013 pointed to the implementation status of access arrangements.

In the five years since the review, there have been no new access entitlements which have significantly driven demand for the IAP.

[5] https://www.ntc.gov.au/Media/Reports/(BD70319C-88ED-CA93-E1A6-E560471A0E1D).pdf
[6] https://www.ntc.gov.au/Media/Reports/(AC428EA5-EE3B-42D6-8978-8ED9AE5FEA65).pdf
[7] https://www.ntc.gov.au/Media/Reports/(969A07AB-745D-49C7-9DB2-2D5249230978).pdf

Demand for the IAP is a function of the incentives (or removal of disincentives) from government authorities/regulators to encourage users to opt-in to regulatory telematics applications (in a voluntary environment).

As highlighted during the NTC Review of the IAP, only half of the access reforms identified in the 2005 RIS have yet been implemented.

The lack of incentives (or removal of dis-incentives) to promote the use and adoption of telematics applications in a voluntary environment (and a perceived lack of leadership (or interest) from 'government' to drive adoption) is a key barrier to wider adoption of the IAP.

2.5 Intelligent Speed Compliance (ISC)

ISC is a certified telematics application to manage vehicle speed.

ISC can be applied as a monitoring condition to transport operators and/or specific vehicles as specified by road agencies and regulators.

Heavy vehicle operators can obtain ISC from an open market of certified service providers.

Road agencies and regulators use ISC to manage excessive vehicle speed.

ISC generates electronic reports whenever a monitored vehicle is detected speeding. Furthermore, automatic reports are also generated if there is a malfunction or tampering is detected.

As a regulatory telematics application – with high levels of accuracy, integrity, security and oversight – reports generated by the ISC application can be used in a similar way to images and records generated by speed cameras, for speed compliance and enforcement.

Background

The ISC application was originally introduced in 2012, in response to calls from TCA's Members for a 21st century approach to monitoring heavy vehicle speed to:

- Supplement traditional approaches to managing speed compliance
- Provide a secondary line of defence for speed limiter malfunctions or tampering (which may otherwise go undetected)
- Utilise certified telematics as a supervisory intervention to monitor vehicles (or vehicle fleets) with a poor history of speed compliance.

As a regulatory telematics application administered within the *National Telematics Framework*, the ISC application provides the necessary levels of accuracy, integrity and security in measuring vehicle speed for compliance management purposes.

A key aspect of ISC is that it offers certificate-based evidence (in the same way as the IAP does), which allows TCA's Members and other regulators to rely on the data derived from the ISC application for enforcement and prosecution purposes.

Use case examples

In Queensland and Western Australia, ISC is used to monitor and enforce the maximum permissible speed of heavy vehicles.

In these jurisdictions, ISC has been used to manage compliance with maximum speed limits applied to specific heavy vehicle combinations and/or loads.

In each of these examples, the ISC application is used in conjunction with road access monitoring through the IAP application.

When linked to the IAP, ISC is used in conjunction with heavy vehicle access conditions and the legislative provisions contained in the Heavy Vehicle National Law (HVNL).

These same arrangements can be implemented immediately in New South Wales at zero cost.

Furthermore, the NSW Government can elect to use ISC as a stand-alone instrument or coupled with road access conditions monitored through the IAP.

Enhancements to the ISC application

TCA is introducing three enhancements to the ISC application:

- Low Speed Guidance (operational and available) for low speed thresholds (<40 km/h) (available now) – policy use example: providing access to infrastructure that necessitates low speed travel including shared vehicle pedestrian areas, school zones, or heavy vehicles traversing vulnerable structures
- Unique maximum speed thresholds which can be applied to the individual boundaries of each State and Territory (*available during Q1 2018*) – policy use example: setting jurisdictionally specific speed requirements
- Spatially-defined speed limits allowing specific speed thresholds (>40km/h) to be applied to geographic areas/zones or road lengths (*currently being implemented*) – policy use example: road works, speed zones in CBD areas and townships, restricted speed zones for heavy vehicles (e.g. steep decline).

Details of each enhancement to the ISC application, and how they support different policy and operational needs of Members, are contained at Appendix A.

2.6 Intelligent Speed Management (ISM)

Intelligent Speed Management (ISM) is a set of operating requirements necessary to accurately measure vehicle speed using Global Positioning System (GPS)-enabled telematics devices and systems.

TCA developed ISM in response to issues about the perceived accuracy (and inaccuracies) of telematics devices for speed management and reporting purposes.

Any transport operator which utilises telematics systems that reference GPS – or an alternative Global Navigation Satellite System (GNSS) – to monitor vehicle speed can benefit from ISM.

Unless appropriately configured (in line with ISM requirements) there can be significant differences in the way telematics systems measure and report speed.

Although the heavy vehicle industry drove the need for ISM operating requirements (as a way to manage their chain-of-responsibility obligations) TCA is aware that ISM is now being used across telematics applications to measure and report vehicle speed.

Transport operators and other parties can utilise ISM as a way to assist in the management of chain-of-responsibility obligations, by gaining assurance through the accurate measurement of vehicle speed.

ISM is different to ISC, as it:

- Is not a certified telematics application which is operationally oversighted by TCA
- Does not automatically report speeding events to road agencies/regulators
- Does not detect malfunctions or possible tampering.

Despite this, ISM provides a means for transport operators to better utilise GNSS capabilities to accurately measure speed in their vehicles.

2.7 Traveler Information Exchange

The Traveller Information Exchange enables information from multiple sources to be made available to drivers, by telematics providers, via in-vehicle devices.

Despite the growth in the availability of information from multiple sources and locations, this information is not always provided in ways that can be easily accessed or able to benefit users of the road network.

The transport and logistics sector has long been calling for better access to information along the supply chain, to improve productivity, efficiency and safety.

To this end, TCA is currently working with road agencies, ports and other facilities to incorporate further information sources, such as road data, empty container park queue information, variable speed limits, and emergency information.

The Traveller Information Exchange has been built to allow data to be shared in a common language – consistent with the Telematics Data Dictionary managed by TCA – so that all systems can access and distribute the information.

This application provides a key point of access for real-time information.

2.8 Route guidance application

The route guidance application enables telematics providers to offer turn-by-turn directions to heavy vehicle drivers based on vehicle load, dimensions and configuration, as well as other parameters such as time of day.

The route guidance application relies on the provision of road attribute data from road and transport agencies.

VicRoads was the first to make road attribute data available for use through the Route Guidance Application, setting the benchmark for other road agencies to follow.

TCA has been working with RMS to obtain road attribute information available for the New South Wales road network, so that the route guidance application to be offered to heavy vehicle drivers in New South Wales.

The open technology market of providers is actively seeking this road attribute data from New South Wales, in response to customer demand.

However, at the time of writing, road attribute data from RMS is yet to be made available.

This application has the potential to offer significant road safety benefits, by helping drivers stay on approved roads (and avoid restricted areas which pose a safety risk).

2.9 Real-time alert application

TCA is currently implementing real-time alerts to be made available through the *National Telematics Framework*.

Real-time alerts can increase the identification of high-risk events associated with specific drivers, vehicle types, and/or vehicle loads, where an immediate response or intervention is required by road agencies/regulators.

Based on the outcomes of consultation with road and transport agencies across the country, it is anticipated that real-time alerts will be reserved for the most serious policy and operational risks.

Candidate uses of real-time alerts identified by road and transport agencies relate to:

- The safe operation of heavy vehicles
- Risk management of the interaction between heavy vehicles and physical infrastructure.

This reflects the following two dimensions which appear to influence the focus of stakeholders within road and transport agencies:

- Key risks on the road network are disproportionately skewed towards the operation of heavy vehicles

  and

- There is a greater population of heavy vehicles already fitted with telematics devices that can enable the activation of real-time alerts.

The availability of real-time alerts presents the NSW Government with opportunities to identify and respond to immediate safety events.

2.10 On-demand access to telematics data application

TCA is currently implementing a new application through the *National Telematics Framework* for road agencies and regulators to obtain access to telematics data (as and when required) for safety management and compliance purposes.

Critically, road agencies and regulators need assurance that by accessing data at a later date, the accuracy and integrity of data is maintained. Assurance is also demanded that data is stored securely and not able to be alternated, manipulated or destroyed.

The availability of on-demand access to telematics data presents the NSW Government with opportunities to trigger requests for data, as and when required, to support audits and investigations which relate to the operation of heavy vehicles.

2.11 On-Board Mass (OBM) application

The management of mass, and mass loadings of vehicles, is a contributing factor to the safe operation of heavy vehicles.

Commonly known as weigh scales or mass systems, OBM Systems are able to measure the axle group mass and gross vehicle mass of heavy vehicle combinations.

The OBM application deliver three levels of assurance for the OBM application – depending on the needs of policy makers and industry users.

During 2017, TCA released the *On-Board Mass (OBM) System Functional and Technical Specification*.

The Specification contains performance-based outcomes for the accuracy, integrity and performance of OBM which can satisfy the needs of both industry and government.

The Specification was informed by operational deployments of commercially-available OBM Systems linked to the IAP in New South Wales and Queensland.

The OBM application can be used in three ways:

- Self-assessment
- Type-approval
- Certification.

<u>Self-assessment</u>

Stakeholders can self-assess conformance with the OBM application:

- **Heavy vehicle operators and end-users** can benchmark existing systems, or be better informed when procuring OBM Systems
- **Suppliers** of OBM Systems can benchmark their existing products.

Type-approval

Suppliers of OBM Systems can obtain type-approval of their OBM System/s by TCA.

Type-approved OBM System will offer transport operators and end-users the assurance that OBM Systems have been independently verified by TCA through the type-approval process.

This will allow transport operators and end-users with the ability to obtain greater assurance in the use of OBM Systems, where the measurement of mass is a key requirement to conform with the Mass Management Module of the National Heavy Vehicle Accreditation Scheme (NHVAS) and to demonstrate conformance that mass limits are being met for other parties along the supply chain (chain-of-responsibility).

Since introducing the availability of type-approval of OBM Systems in mid-2017, TCA has received five type-approval submissions from OBM Suppliers.

Type-approved OBM Systems are expected to become available during 2018.

Certification

TCA is currently implementing a new certified service offering for OBM Systems.

The certified OBM application will provide a further level of assurance, beyond what is provided by type-approval.

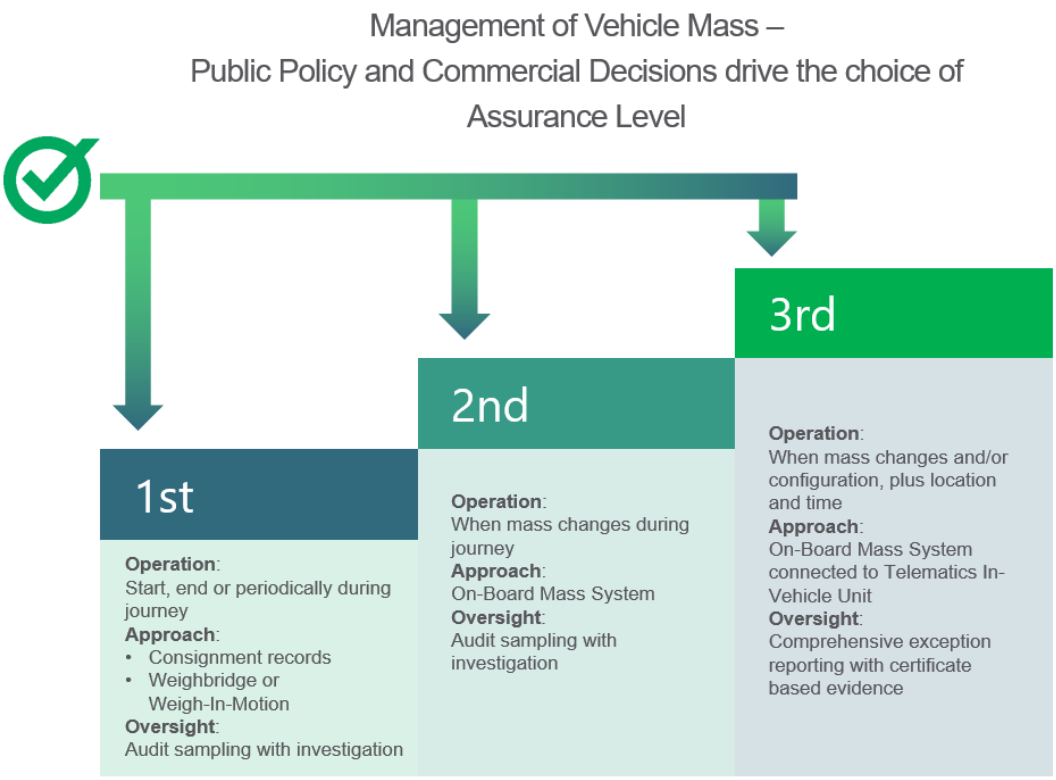
TCA certification of OBM System will provide the highest level of assurance required for mass information to meet public policy objectives for regulatory purposes, internal business and/or contractual requirements of a transport operator or end-user.

This assurance will be provided by having a higher level of confidence in the accuracy and reliability of the mass information collected, including when it is not being collected because of malfunction, miscalibration or potential tampering.

Just as importantly, the certified OBM application will link mass information to other key pieces of data, including the configuration of the vehicle, its location and time of collection, and, when required, its speed. This means that mass information is not only more reliable and available but contextually aligned with other key pieces of information, allowing for richer use.

The ability to link mass information to other parameters is a cornerstone of the *National Telematics Framework*, as is the interoperable, scalable and secure platform that has been developed by governments for public and private policy usage.

The different levels of assurance available through the OBM application is diagrammatically represented in the following diagram:



2.12 In-vehicle connectivity application

The in-vehicle connectivity application enables a standardised connection and communication of in-vehicle devices with other systems and devices.

With the emergence of telematics services that integrate functions – such as electronic user interfaces, dispatch systems, On-Board Mass (OBM) systems and the like – the application enables the capabilities of telematics devices, such as Global Navigation Satellite System (GNSS) time and positioning referencing, to be leveraged.

The application can be used for any mode of transport with telematics devices, including taxis, cars, locomotives, maritime vessels (including ferries) and heavy vehicles.

This allows a Telematics IVU to be used a telematics 'hub' by providing interconnectivity with other related intelligent technologies – supported by a common telematics data dictionary which is managed by TCA on behalf of governments and industry sectors.

3 HOW TCA HAS WORKED WITH THE NSW GOVERNMENT

TCA has worked closely with RMS and TfNSW – and in conjunction with other government stakeholders and heavy vehicle industry participants – to advance the use of telematics to improve road safety.

Key examples of include:

- Operational Pilot of Electronic Work Diaries (EWDs) and Speed Monitoring Systems (SMS)
- Entry Options initiative
- Flexible Use Charging
- Smart rest area initiative
- Mandatory Alcohol Interlock Program (MAIP)
- Using certified telematics for dangerous goods vehicles.

3.1 Operational Pilot of Electronic Work Diaries (EWDs) and Speed Monitoring Systems (SMS)

In December 2010, the NSW Government initiated work with TCA to undertake an Operational pilot of Electronic Work Diaries (EWDs) and Speed Monitoring Systems (SMS).

TCA worked with the New South Wales Government between 2011 and 2013 to assess the feasibility of the Electronic Work Diary (EWD) in an operational setting.

The outcomes of the Operational Pilot led to recommendations which assisted in further developing policy (which was led by the NTC), and functional and technical requirements for EWDs (which was led by TCA).

3.1.1 Background

The EWD Pilot was funded as an initiative of the New South Wales government as part of the 2010 Road Toll Response Package, which provided $170 million for a range of road safety initiatives.

Funding of over $5 million was provided for the EWD Pilot to determine the technical and operational feasibility of EWDs, and the extent to which EWDs would contribute to improved fatigue compliance and under what operational environment.

The EWD Pilot was managed through a range of committees and working groups.

Membership of these committees included representatives from industry, the then National Heavy Vehicle Regulator (NHVR) Project Office, TCA, the NTC, the Australian Government as well as Police and Road Transport Agencies from New South Wales, Queensland, South Australia, Victoria and Western Australia.

Additionally, an independent consultant was engaged to provide an independent review and assessment of the EWD Pilot findings.

3.1.2 Documented outcomes from the pilot

The EWD Pilot resulted in three key and interrelated documents as follows:

- Final Report Operational Pilot of Electronic Work Diaries and Speed Monitoring Systems produced by RMS (Final Report) (RMS 2013)
- Preparing Australia for Electronic Work Diaries Regulatory issues paper prepared by the NTC (Regulatory Issues Paper) (NTC 2013)

- Electronic Work Diary Functional and Technical Specification (Draft) prepared by Transport Certification Australia (EWD Specification) (TCA 2013).

The Final Report presented the findings and recommendations of the EWD Pilot, which anticipated that the introduction of EWDs will make a positive contribution to fatigue management, and potentially lead to fewer fatigued heavy vehicle drivers on the Australian road network.

Critically, the EWD Pilot has identified that there are road safety benefits from the introduction of EWDs. Based on the Final Report, a one per cent reduction in fatalities on 2012 information, can lead to a $15.68 million net cost benefit. The introduction of EWDs when compared to WWDs, even at the lowest levels of take-up modelled (one per cent) shows a net cost benefit of $7.5 million over five years.

The Regulatory Issues Paper presents the potential changes to the HVNL to support the outcomes of the EWD Pilot. The Regulatory Issues Paper focuses on privacy and surveillance issues, enforcement and treatment of small breaches, and implications to drivers.

The EWD Specification translates the outcomes of the Final Report and recommendations within the Regulatory Issues Paper into performance based functional and technical requirements for an EWD.

3.1.3 Implementation of outcomes from the pilot

During 2014 and 2015 a Detailed Project Management Plan (DPMP) was jointly developed by TCA and the NHVR to guide the implementation of the EWD.

In recognising that the EWD represented a major technical and regulatory reform, involving a diverse range of stakeholder interactions, the DPMP was informed following extensive consultation with:

- TCA Member organisations, and other government transport agencies
- Police forces across the country
- NTC
- Australian and New Zealand Policing Advisory Agency (ANZPAA).

In November 2015 Responsible Ministers approved the DPMP inclusive of the EWD operating model (incorporating the use of automated systems that enable on-side compliance assessments using EWD data to be performed), together with a budget for the NHVR to implement the EWD with TCA.

This decision represented the culmination of:

- The outcomes from the Operational Pilot of EWDs and SMS
- Detailed consultation and planning with a diverse range of stakeholders
- Previous policy positions endorsed by Responsible Ministers during 2013
- The development of a DPMP (as presented and endorsed by Responsible Ministers).

The NHVR and TCA were the two national government bodies assigned with the responsibility to implement the EWD – in coordination with road and transport agencies, police and other stakeholders.

TCA and the NHVR formally commenced work on the implementation of the EWD in March 2016.

TCA progressed the implementation of its activities in accordance with the timeframes and deliverables in the DPMP (up until October 2016 – see below).

3.1.4 Progress to date

The planned implementation of the EWD has not progressed in accordance with the DPMP. What follows is a summary of key dates which have influenced this outcome.

In August 2016 the NHVR advised TCA that it was initiating a review of the EWD operating model.

In October, the NHVR advised that it would be developing an alternate EWD operating model, and that implementation work in accordance with the DPMP should cease.

3.1.5 Current status

In mid-December 2017 the NHVR released a Policy Framework and Standard for the EWD.

It is not the intent of this submission to compare or assess the two different approaches (i.e. the outcomes from the Operational Pilot and the NHVR's approach). However, the Policy Framework proposed by the NHVR departs from the original model in some key areas, including the removal of:

- Linkages to the National Telematics Framework
- The ability for work and rest details to 'follow-the-driver with integrity' (using secure, digital mechanisms) – irrespective of what vehicle or technology provider is used
- High integrity data collection, transfer, communication, storage (so that data can be used as prima-facie evidence)
- Automated reporting of fatigue-related breaches on the road-side to authorised officers and Police.

3.2 Flexibility package for transport operators

TCA worked with RMS and the then NSW Minister for Roads and Ports, the Hon Duncan Gay MLC during 2012 and 2013 to introduce two initiatives to make the IAP more flexible and cost effective for heavy vehicle operators:

- Entry Options initiative
- Flexible Usage.

Both initiatives were developed in consultation with the NSW Road Freight Industry Council (RFIC) and received a positive endorsement as they responded to industry need.

The input obtained from the RFIC made the IAP more flexible and cost-effective for a wider range of transport operators that wanted to benefit from the higher productivity access entitlements made available through the IAP.

3.2.1 Entry Options Initiative

The Entry Options initiative is available to any transport operator wanting to assess their existing telematics devices against national functional and technical requirements.

The Entry Options initiative allows transport operators to present their existing telematics devices for assessment by TCA.

There were three participants involved in the initial pilot of the Entry Options initiative announced by Minister Gay during 2012 – Boral, Toll Group and Simon Transport.

The Entry Options initiative was expanded, so that it was made available to all transport operators across the country, in early 2013.

3.2.2 Flexible Usage

Flexible Usage responds to the diverse needs of different transport operators using the IAP.

For many transport operators, only a small proportion of their trips need the IAP – for example, when they are loaded to Higher Mass Limits (HML).

Under Flexible Usage, TCA reduces its Operational Fee – which covers the costs of auditing IAP services delivered by certified service providers to satisfy regulatory requirements – based on the level of IAP use per vehicle, on a monthly basis.

Flexible Usage has provided new opportunities, by making the IAP more cost-effective to a wider range of transport operators – especially for those that may not have considered the IAP before.

3.3 Smart rest area initiative

TCA worked with TfNSW during 2013 to develop a 'smart rest area' initiative which could provide information to heavy vehicle drivers about the availability and occupancy of rest areas.

The initiative was intended to leverage the outcomes of the Operational Pilot of EWDs, which identified the value of providing 'in-cab' advisory warnings to drivers to provide information on their next rest period(s).

The availability of 'smart rest areas' takes this concept further, enabling rest areas to communicate in real-time to EWD devices, allowing drivers to benefit from knowing a combination of the following:

- Information about their next designated rest period(s)
- The next available rest area
- The current availability of parking spaces at the next available rest area
- The provision of alternative rest area locations (if there are limitations on the availability of parking at the next rest area).

TCA worked with TfNSW and RMS to implement a smart rest area trial, but information is not currently supplied through the *National Telematics Framework* (for use through the Traveller Information Exchange).

The provision of rest opportunities for heavy vehicle drivers is seen as a critical element in managing driver fatigue and reducing the incidence of road accidents.

A common complaint from the transport sector and heavy vehicle drivers is that insufficient parking and poor facilities prevent access to or discourage the use of certain rest areas.

The provision of rest area information through telematics can provide drivers with better access to real-time information to plan their trips and manage fatigue.

3.4 NSW Government Mandatory Alcohol Interlock Program (MAIP)

TCA worked with TfNSW and RMS to implement the NSW Government's Mandatory Alcohol Interlock Program (MAIP).

Implemented as an application of the *National Telematics Framework*, TCA was responsible for:

- The development of a performance based, functional and technical specification for alcohol interlocks, and a user guide for alcohol interlock providers
- Performing a risk-based review of the functional and technical elements of the MAIP
- Leading an independent review of applications received from the open technology market to provide alcohol interlock products and services in the MAIP
- Performing a post-implementation audit of alcohol interlocks.

The independent assessment and post-implementation audit of alcohol interlocks performed by TCA on behalf of TfNSW provided assurance that alcohol interlocks – when fitted to vehicles and utilised by end-users – operate in accordance with the Specification, together with the necessary elements of the Provider Guide.

TCA continues to provide ongoing support to TfNSW and RMS, by providing periodic audits of alcohol interlocks and providers.

3.5 Using certified telematics for dangerous goods vehicles

Following the fatal crash involving a dangerous goods vehicle in Mona Vale on 1 October 2013, the then NSW Minister for Roads and Ports, the Hon Duncan Gay MLC, requested an assessment of mandating the use of the IAP on dangerous goods vehicles.

TfNSW and RMS were directed to work with the RFIC and the NHVR to investigate the utilisation of the IAP for this purpose.

TCA also worked with TfNSW and RMS in providing advice on the use of certified telematics applications to improve the management of dangerous goods vehicles though the *National Telematics Framework*.

3.5.1 Progress to date

There has been no real progress since 2013 to use telematics to improve the safety management of dangerous goods vehicles.

Firstly, the regulation of dangerous goods vehicles is the responsibility of the Environmental Protection Authority (EPA), not TfNSW or RMS. Despite the announcements made by, and the intent of Minister Gay to use telematics in dangerous goods vehicles, the institutional arrangements within the NSW Government mean that it was the responsibility of another (non-transport) portfolio to lead reforms concerning dangerous goods vehicle operations.

Secondly, there was not widespread support to use the IAP application for dangerous goods vehicles, because it is a 'road access' application (as distinct from a safety application which could improve the safety management of dangerous goods vehicles).

However, in making his announcement to use the IAP for dangerous goods vehicles, it is clear that Minister Gay was referring to the *National Telematics Framework* (as distinct from the IAP application).

To this end, the Minister was seeking to use 'black-box' technology which could deliver high levels of accuracy, integrity and assurance through TCA certification.

3.5.2 Opportunities to progress

Despite the intent of the Minister Gay's intentions not having been realised at the time, there remain opportunities to improve the management of dangerous goods vehicles through applications of the *National Telematics Framework*. For example, the following applications can be used to improve the safety management of dangerous goods vehicles:

- Route guidance application – turn-by-turn instructions can be made available specifically for drivers of dangerous goods vehicles (so that drivers stay on approved roads and avoid restricted areas which pose a safety risk)
- Real-time alert application – alerts can be sent to RMS when dangerous goods vehicles are travelling towards, or have entered, sensitive or restricted area (for example, tunnels) and/or to emergency personnel if a dangerous goods vehicle is involved in a crash.

Further, the *National Telematics Framework* enables electronic manifests to be generated (and accessed) in a central location (so that emergency personnel can access details about the details of what dangerous goods vehicles are transporting before arriving at a crash scene). This would overcome the reliance on current legacy approaches, which rely on drivers carrying paper manifests in dangerous goods vehicles.

4 TCA'S WORK IN OTHER JURISDICTIONS

This section provides a brief overview of relevant work performed by TCA in conjunction with road and transport agencies from other jurisdictions.

4.1 Industry Framework for Trialling Road Freight ITS and Associated Technologies – Victorian Government

The Victorian Department of Premier and Cabinet, VicRoads and Transport Certification Australia (TCA) managed an Industry Framework to facilitate the introduction of innovative proposals for the use of Intelligent Transport Systems (ITS) and associated technologies, with a view to improving the efficiency, reliability and safety of road freight transport on the Victorian road network.

The Industry Framework was announced in February 2015 by the Minister for Roads, Road Safety and Ports, the Hon Luke Donnellan MP.

The Industry Framework was intended to support the *Victorian Freight and Logistics Plan*, which contains a direction to *develop and run freight technology demonstration projects*.

In this context, the Industry Framework sought to establish a mechanism to foster a collaborative approach to challenges and opportunities identified by the road freight transport sector, the ITS industry and the Victorian Government.

The Industry Framework generated a strong level of interest from the road transport sector, and the telematics and ITS sectors.

Two trials progressed on the Victorian road network, without imposing any direct financial costs on the Victorian Government.

A similar mechanism could be established in New South Wales to facilitate the pilots and trials of telematics to deliver improved road safety outcomes.

4.2 Official Demonstrations Partner at 23rd ITS World Congress in Melbourne (2016)

TCA led the demonstrations of connected and automated vehicles at the 23rd ITS World Congress in Melbourne (October 2016).

TCA worked with VicRoads and some of the world's leading providers of intelligent transport systems to showcase the latest in connected and automated vehicle technology applications on the streets of Melbourne.

The technical demonstrations and tours will showcase applications of the latest ITS technology, including connected, driverless and automated vehicles.

The demonstration showcased how, for the first time anywhere in the Southern Hemisphere, how individual technologies could 'talk to each other' and the roadside using an open, agreed language.

TCA is now working to support the extension of operational pilots in Queensland (and other jurisdictions) by focusing on security management in an Australian context – consistent with what is being trialled in the European Union and the United States.

4.3 Assessment of railway crossing safety technologies

During 2012 TCA undertook a strategic assessment of railway crossing safety technologies on behalf of VicRoads (to manage heavy vehicles at non-signalised level crossings).

The assessment involved analysing two different technologies and delivery of a report on the findings of the review and pathways for progressing the deployment of such technologies in the future.

TCA advised against stand-alone, single-purposes technologies which were being advocated by some technology providers and stakeholders.

TCA highlighted the significant financial and non-financial costs to governments in funding the implementation of rail crossing safety technologies that:

- Have the potential to create unnecessary costs
- Are not scalable or sustainable
- Cannot be co-located with other telematics applications supported by existing in-vehicle devices
- Create unnecessary duplication and delay future developments.

4.4 Operational pilot in Sweden

TCA managed an operational pilot of the IAP in Sweden, following the signing of a Memorandum of Understanding between Trafikverket (Swedish Transport Administration) and TCA in 2012.

The IAP was identified by the Swedish Government and industry representatives as a low-cost, 21st century approach to the management of heavy vehicle access and compliance.

TCA worked closely with Trafikverket and a consortium of stakeholders, including Transportstyrelsen (Swedish Transport Agency), Lund University, CLOSER, the forest research institute Skogforsk, and heavy vehicle manufacturers and active participants Scania and Volvo.

The pilot demonstrates the IAP's ability to increase access entitlements for High Capacity Transports (HCT) on the Swedish road network, by ensuring that productivity, safety and environmental outcomes are advanced in unison.

5 TCA'S WORK ON CONNECTED AND AUTOMATED VEHICLES

This section provides a brief overview of TCA's work on Connected and Automated Vehicles (CAVs).

TCA's focus, on behalf of its Members, has been on standardisation and security.

5.1 Leading discussion on security

In September 2016, TCA released a discussion paper entitled *Towards a national vision for a secure, connected future through Cooperative Intelligent Transport Systems (C-ITS)*[8].

Cyber security is not something traditionally dealt with in the transport portfolio but is an essential ingredient as vehicles become 'computers on wheels'.

Establishing new ways for 'trust' to be established between vehicles and all road users is central to the successful roll-out of CAVs.

A *Security Credential Management System* (SCMS) is the generic term for the internationally-agreed best-practice approach (inclusive of policies, processes, people and technologies) that provides digital security for CAVs within a C-ITS environment.

In simple term, an SCMS is necessary to:

- Enable *trust* between participants with no prior relationship (e.g. two vehicles approaching the same intersection)
- Provide *privacy* in communication such that a vehicle does not need to broadcast its identity (and thus can be trusted without needing to be identified, so that its journey cannot be inadvertently tracked)
- Provide different levels of *permission* to different participants (e.g. emergency vehicle)
- Allowing only *verified* participants access to the C-ITS environment (including passing any necessary conformance requirements)
- Manage *misbehaving* participants within the C-ITS environment.

A statement made by the United States Department of Transport (DoT) on 18 December 2017 highlighted the importance of a SCMS, being:

> *A key component of connected vehicle applications is the assurance that messages received from other devices are valid, i.e., a received message has not been sent by a hacker or simply a malfunctioning device. Traffic management functions, and even more crucially, split-second collision avoidance, depend on establishing that received messages can be trusted as accurate. The mechanism that will ensure connected vehicle messages can be trusted is the SCMS.*

In *February 2018*, TCA released a further paper entitled *Key Decisions to Progress Australian Deployment of a Security Credential Management System*.

This report incorporates feedback received from the discussion paper released in September 2016 and is intended to inform decisions which need to be made in Australia.

The report – which is the first of its kind – specifically maps the key issues and options in an Australian context.

Like any key piece of infrastructure, an Australian SCMS needs to be approached as a long-term national investment: the product of careful policy, planning and consideration as to its capability and longevity, and the organisational elements necessary for operation and maintenance.

[8] http://www.tca.gov.au/documents/View%20Discussion%20Paper.pdf

5.2 Advocating the need for protection and management of the 5.9GHz spectrum

TCA has advocated the need for the Australian Communications and Media Authority (ACMA) to protect and manage the 5.9GHz spectrum[9].

The 5.9GHz spectrum is a key enabler for connected and automated vehicles and is – at present – the only reliable medium for the broadcast of safety-critical messages between vehicles and infrastructure.

5.3 Connecting, cooperating and co-leading internationally

TCA is the Australian co-lead on international Harmonisation Task Groups (HTGs) for C-ITS.

TCA works collaboratively with the United States Department of Transportation, the European Commission, and a wide range of international security, technical and policy experts.

TCA provides Australia with a key input into the harmonisation of international standards for CAV, including security provisions and compliance assurance programs for connected and autonomous vehicles.

To coincide with a HTG meeting in June 2017, TCA held a special session in Melbourne to bring together experts from Europe, the United States and Australia to communicate progress and facilitate discussion on security, trust, privacy and interoperability for Connected and Automated Vehicles – key areas that will underpin the cooperative and connected transportation network into the future.

5.4 Contributing to the iMOVE Cooperative Research Centre (CRC)

TCA is an Associate member of the iMOVE CRC.

The iMOVE CRC will draw together leading government, industry and researchers to work together in a 10-year collaboration involving projects and initiatives associated with CAV deployments.

On 7 March 2017 it was announced that the Australian Government would contribute $55 million over a ten-year period towards the iMOVE CRC.

5.5 Connected and Automated Vehicle Initiative (CAVI)

TCA will shortly commence work to the Queensland Department of Transport and Main Roads (TMR) to translate SCMS policy and operational decisions into technical actions for the CAVI.

This approach is influenced by the fact that Australia and New Zealand (AuNZ) do not currently have a formal policy position on a national SCMS, and standards do not yet exist for all SCMS functions.

The inclusion of an SCMS in CAVI is a significant asset to demonstrate a realistic, live C-ITS environment, with the opportunity for CAVI to:

- Inform AuNZ C-ITS security policy
- Demonstrate an operational (and potential business) model for an AuNZ SCMS
- Inform development of SCMS policies and standards.

The CAVI SCMS will be representative of a realistic, live C-ITS environment, with the following use cases able to be considered, documented, implemented, operated and contributed to by TCA to ensure the SCMS achieves (and continues to achieve) its intended outcomes:

- Enrolling C-ITS participants, including determining necessary identifiers and their management

[9] http://www.tca.gov.au/documents/TCA_Submission_ACMA1.pdf

- Use of different permission levels and management of permission assignment to C-ITS participants
- Ensuring messages from unauthorised C-ITS participants are not trusted
- Managing misbehaving participants, including the possible simulation of malfunction or misbehaviour, and diagnosing C-ITS stations introduced into the CAVI testbed that fail to consistently operate in a manner compliant with the C-ITS/SCMS standards
- Potentially operating multiple Root Certificate Authorities with a Certificate Trust List (relevant if adopting the European federated architecture/paradigm)
- Determining more detailed operating requirements for SCMS entities and SCMS users.

6 ABOUT TCA

This section provides information about TCA and the organisation's role and function, a description of the term 'telematics' and the *National Telematics Framework*.

6.1 Overview

TCA supports government agencies and regulators by providing programs and services that are outcome-focused, technology agnostic, disruption-resilient. TCA programs and services address the security requirements and privacy concerns of users, providers and government; encourage innovation, and facilitate appropriate private sector contribution to the costs of regulation.

The use of telematics and related intelligent technologies – including C-ITS and Connected and Automated Vehicle (CAV) applications – advance surface transport productivity, safety and compliance outcomes.

TCA's role and function is to administer applications of telematics and related intelligent technology on behalf of Australian road and transport agencies, as well as other agencies/regulators.

Governments rely on TCA to represent their interests when developing and implementing policy reforms which depend on the use of technology.

TCA's functions and services (Advice, Accreditation and Administration services) now span across the following public policy domains:

- Management of an Open Technology Market (through the *National Telematics Framework*, which is a digital and business platform for use by governments and industry sectors)
- Heavy vehicles
- Public transport (buses and ferries)
- Taxis, hire cars and ride sharing
- Safety-based technologies for road safety (light vehicles)
- Connected and automated vehicles (light and heavy vehicles)
- Road transport network management.

TCA derives its powers from different instruments linked to policy sectors, including:

- Ministerial policy decisions
- Legislation and regulations
- Guidelines
- Approval powers granted by TCA's Members and/or other organisations.

TCA's origins were in heavy vehicle reforms which were dependent upon the use of telematics to advance productivity and safety outcomes for Australian Governments.

To this end, the initial focus of TCA was to introduce the first regulatory telematics application – the Intelligent Access Program (IAP) – to improve the management of heavy vehicle productivity and access.

6.2 What is telematics?

The term 'telematics' refers to integrated systems of information, communications and sensors to exchange data and information between vehicles and other locations, including:

- Vehicle to infrastructure (V2I) applications

- Vehicle to vehicle (V2V) applications
- Vehicle to elsewhere (V2X) applications.

Telematics is increasingly being used across surface-based transport – and in particular heavy vehicles, to improve safety, productivity and efficiency outcomes.

Telematics enables:

- The monitoring and reporting of vehicles and infrastructure
- Information to be sent to and from vehicles
- The implementation of Connected and cooperative vehicles
- The implementation of Automated and autonomous vehicles.

The use of telematics and intelligent technologies present opportunities for policy makers to innovate and advance outcomes across surface transport modes.

In light of the recent high number of NSW road accidents involving trucks, telematics has a role in improving safety and, ultimately, saving lives.

However, these opportunities can only be realised if the complex interaction of policy, technical, commercial and operational dimensions are progressed in a coordinated manner between government, the heavy vehicle sector and TCA.

6.3 TCA's role and function

Australian Governments increasingly depend on the use of telematics and related intelligent technologies to deliver public purpose outcomes across surface transport modes[10].

TCA's role involves the interaction of three distinct stakeholder groups to deliver improved public outcomes:

- Government agencies (which set policies in relation to the use of telematics to regulate end-users)
- Regulated end-users (which use telematics applications in response to government policies)
- Private sector service providers (the technology and Intelligent Transport System (ITS) sector, which deliver telematics products and services to regulated end-users to conform with government policies).

TCA is responsible for ensuring the use of telematics meets the accuracy, integrity and security needs of stakeholders.

Road agencies rely on TCA to confirm the evidentiary standard of telematics data, so that court-based compliance and enforcement actions can be initiated.

6.4 Updates to TCA's Constitution

During 2016 TCA's Constitution and MoU was updated to:

- Reaffirm TCA's established role with respect to telematics and related intelligent technologies
- Expand TCA's role to support the emergence of connected and automated vehicles
- Recognise TCA's role in providing assurance through:

[10] TCA's Strategic Plan, and the objects contained within TCA's Constitution and Memorandum of Understanding (MoU) were updated by its Members during 2016 and reflect TCA positioning itself across surface transport modes.

- The type-approval of devices and systems
- The certification and audit of technology providers.

TCA performs a key role in avoiding:

- Potential *market failures*, such as proprietary-based systems inhibiting inter-operability, or technology applications which impact the safety of road users

  and

- Potential *regulatory failures*, such as unintended technology prescription, or poorly constructed policy positions which could lead to duplication and inconsistencies.

There is no other entity – government or private – which performs TCA's role and function.

6.5 This isn't just about technology…

TCA works with Australian governments and industry sectors to deliver outcomes that are:

- Technically feasible
- Cost effective and financially sustainable
- Operationally deliverable
- Able to deliver upon policy intent
- Able to manage risks associated with regulation.

TCA actively removes barriers to innovation and capitalises on new and emerging technologies.

TCA contributes to a whole-of-government approach to telematics applications, ensuring there is harmonisation and interoperability across telematics applications, irrespective of the government agencies or regulators involved, or the intended policy objective.

This platform approach enables a standardised approach to data collection, privacy management and security, providing the common platform and certainty for the marketplace of telematics providers to offer competition and choice to end-users.

TCA's whole-of-government focus – which provides a common 'platform' across policy areas, industry sectors and end-users – encourages providers of telematics and related intelligent technologies to accelerate innovative approaches and the adoption of new and emerging technologies.

Further information on the benefits of this whole-of-government focus is detailed in Appendix A.

6.6 National Telematics Framework

The investments by governments and the technology sector in the *National Telematics Framework* should not be underestimated.

It has provided a stable platform from which stakeholders (government, the technology sector and end-users across multiple industries) now take for granted.

Examples of how the National Telematics Framework has parallels with other operational frameworks in other portfolios and industry sectors is contained at Appendix B.

A casual observation of other regions (internationally) demonstrates the pitfalls of having fragmented governmental and industry approaches to telematics, which do not benefit from a common 'operational framework/platform' which not only supports multiple programs and applications, but encourages innovation, competition and choice.

The lack of framework has resulted in greater costs being incurred by government and end-users, with many vehicles needing to be fitted with stand-alone, single-purpose hardware and devices which duplicate functions.

In Australia, the availability of the *National Telematics Framework* has enabled half of the articulated heavy vehicle fleet to be fitted with TCA type-approved telematics devices, which are able to support any number of applications administered through the National Telematics Framework (including those available now, and those in the future).

This outcome demonstrates how the heavy vehicle industry has elected to purchase telematics hardware which has the requirements necessary to support regulatory telematics applications – even if the transport operator does not have a need or use for regulatory applications today.

This is a strategically important development, and provides significant opportunities for government policy makers, as well as across industry sectors.

6.7 A platform approach

The *National Telematics Framework* is a digital business platform with infrastructure and rules that aims to ensure an open technology market of suppliers/providers of systems and services.

Platform based business models are not new. However, they have become more powerful with the advent of the digital economy.

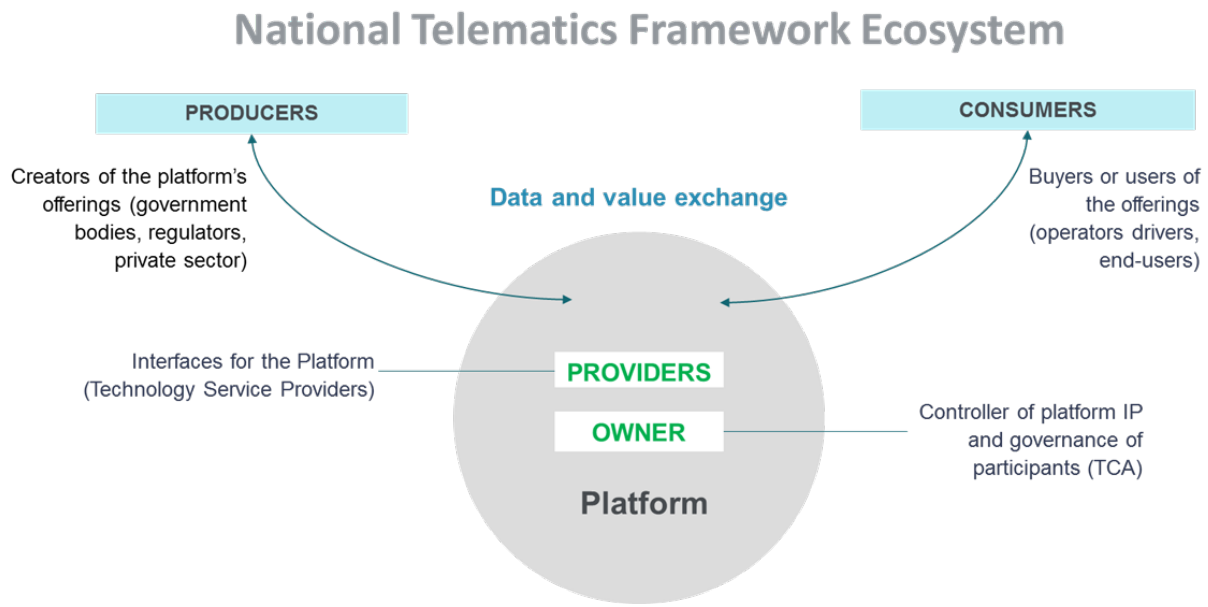
An example of a digital business platform is that of Apple Inc. While many believe Apple has gained advantage technology in the mobile market, it is the use of its digital business platform that has underpinned their success.

Over 10 years ago Ericsson, Nokia and Blackberry dominated the market. They provided traditional 'pipeline' business models and while they supported different applications, these applications were company specific and relied on the company to implement and support them. Apple, on the other hand, adopted a platform approach. They were able to bring together producers of applications and users (or consumers) of these applications in a manner which took advantage of the digital economy providing a simpler, cheaper and scalable solution.

The adoption of the *National Telematics Framework* for the delivery of telematics and intelligent technology systems and services for both public policy and private decision making is a world first. It has positioned Australia governments as the leader in the delivery of such services through a contemporary digital business platform.

For the purpose of explaining the *National Telematics Framework*, traditional 'platform business model' terminology has been adopted. Platforms have an 'ecosystem' comprising four types of players or entities. The **Owner** of the platform that controls its intellectual property and governance. **Providers** who serve as the platform's interface with users. **Producers** that create their offerings, or programs, and finally **Consumers** that purchase and/or use these offerings or programs.

The digital business platform effectively brings together **Producers** and **Consumers** to create and utilise applications and programs, taking advantage of the common digital business platform infrastructure and rule set (see figure over the page).



The above figure highlights the platform relationships of which the four entities are as follows (the text in italic customises the traditional 'platform business model' terminology to that of the *National Telematics Framework* ecosystem):

- **Producers** are the creators of the platform's offerings (including public policy owners or commercial entities) – *in the National Telematics Framework ecosystem, **producers** are government bodies, regulators and private sector entities that create applications that address public and private policy initiatives*
- **Consumers** are the buyers or users of the offerings – *in the National Telematics Framework ecosystem, **consumers** are operators, drivers, and end-users of light and heavy vehicles*
- **Providers** offer the interface for the platform that interfaces to deliver services – *in the National Telematics Framework ecosystem, **providers** are type-approved suppliers, certified service providers and (as applicable by the level of assurance adopted – see section below) non-certified service providers*
- The **Owner** is the controller of the platform intellectual property and the governance of who may participate and in what ways – *in the National Telematics Framework ecosystem, the **owner** is TCA.*

6.8 Benefits of a Digital Business Platform

The *National Telematics Framework* and its associated common infrastructure and rule set delivers:

- An **open technology market**, which can sustainably deliver upon the needs of government, industry and end-user consumers, ensuring choice while delivering the latest developments at increasingly lower costs:
    i. It allows governments a more contemporary procurement model for both regulatory and contractual services where it is not re-inventing the wheel every time it wants to acquire or take advantage of a digital transformation. In doing so it appropriately allocates risk to different entities – governments take policy responsibility as opposed to being responsible for the end to end solution and its associated upkeep
    ii. Enables a shift from 'resource control' (a traditional pipeline business model concept) to 'resource orchestration'. In a platform environment, it is the network of **producers** and

consumers that create and use the assets, as opposed to one organisation controlling resources and market structures to minimise movements of consumers.

- **Consistency and certainty** to providers and end-user consumers, so that government's functional expectations can be relied upon to make both investment and adoption decisions:
  i. Adheres to the Policy Framework for ITS in Australia ensuring a performance-based approach enabling innovation
  ii. Nearly half of the articulated heavy vehicle fleet in Australia now have a TCA type-approved Telematics IVU. **Consumers** (i.e. transport operators) have purchased the equipment for their own purposes, while government benefits by being able to easily implement new applications
  iii. Provides an explicit privacy by design approach recognising the challenges associated with personal information in the digital economy
  iv. Provides data for research purposes that allows both public and private outcomes well beyond that of the purpose of any one application.

6.9 What does the National Telematics Framework consist of?

The *National Telematics Framework* consists of the following inter-related instruments, to enable the operation of a digital business platform:

- A library of **functional and technical specifications** (which translate policy objectives into performance-based outcomes to be met by provides of telematics and related intelligent technologies)
- A **telematics data dictionary**, and common data elements across all specifications (to ensure inter-connectivity and inter-operability, to support any number of current and future applications)
- **Approval**, **type-approval** and **certification** and **re-certification** processes (for providers of telematics and related intelligent technologies – where TCA oversight is required by government and industry)
- **Governance frameworks** to grant (and cancel) **type-approvals** and **certifications** (managed on behalf of road and transport agencies, and other government agencies as required – where TCA oversight is required by government and industry)
- **Legal instruments** to manage (and protect) the relationships between TCA, certified service provides, suppliers of type-approved hardware, systems and devices, and end-users – where TCA oversight is required by government and industry
- **Institutional and governance frameworks** to **manage privacy** requirements, to ensure the use of data collected through telematics and related technologies is used only for disclosed purpose
- **Operational administration** of applications of the *National Telematics Framework* (managed on behalf of road and transport agencies, and other government agencies as required – where TCA oversight is required by government and industry
- **Audit programs** (managed on behalf of road and transport agencies, and other government agencies as required – where TCA oversight is required by government and industry
- **Legislation** to support specific regulatory programs of the *National Telematics Framework.*

7 APPENDIX A – ENHANCEMENTS TO THE ISC APPLICATION

Enhancement	What it does	Policy use examples	Availability	Status
Low Speed Guidance app.	Vehicles can be monitored at low speed speeds (<40 km/h).	Management of vehicle speed for: • Shared vehicle pedestrian areas • School zones • Heavy vehicles required to traverse vulnerable structures at low speed.	Offered by all certified service providers Available through the Telematics Analytics Platform (TAP).	Operational and available.
Separate speed thresholds for each jurisdiction.	Separate speed thresholds can be applied to individual vehicles within the geographic boundaries of each State and Territory.	Heavy and Light vehicles can be monitored against different legal speed limits, which can be applied in each jurisdiction. Monitoring of maximum heavy vehicle speed limits can: • Be used to detect speed limiter malfunctions and/or tampering *and/or* • Overcome the customary reliance on speed limits.	Offered by all certified service providers Available through established jurisdictional systems.	Operational and available from Q1 2018.
Spatially-defined speed thresholds.	Specific speed thresholds can be applied to geographic areas/zones or road lengths.	Management of vehicle speed – Heavy and Light, for: • Road works • Speed zones in CBD areas and townships • Restricted speed zones for heavy vehicles (e.g. steep decline).	Offered by all certified service providers Available through established jurisdictional systems.	Currently being implemented.

8 APPENDIX B – PARALLELS WITH OTHER OPERATIONAL FRAMEWORKS

Examples of operational frameworks which deliver public outcomes in other portfolios

The efficient operation of any well-functioning market is derived from the interaction of laws, institutional arrangements, policies, administrative practices and business rules, which provide guidance and confidence to all stakeholders.

The *National Telematics Framework* provides an example of how a well-functioning market can advance:

- Public outcomes sought by governments, industry sectors and the community (including productivity and safety reforms enabled through the use of telematics)

  together with

- Private interests of individuals and organisations (in pursuing business outcomes through the use of telematics).

The *National Telematics Framework* has demonstrated the ability support competition and innovation in a formalised, structured environment.

The operation of the *National Telematics Framework* is comparable with, and has direct parallels to, other operational frameworks administered by government agencies where there is an identified need to:

- Deliver public outcomes in a specific policy area, or legislative objective
- Manage interactions between different stakeholders to achieve outcomes
- Achieve a balance between public and private interests.

The following table aims to highlight that, despite the differences in policy areas and contextual parameters, there are distinct similarities between the *National Telematics Framework* with other operational frameworks administered, managers and or supervised by other government agencies.

Notably, the table highlights three distinct parallels in:

- The instruments used, and activities performed by, administrators of frameworks
- The provision of operational oversight, reporting and corrective mechanisms to manage the functioning of frameworks
- The delineation of roles and responsibilities of different stakeholders within frameworks (with three key types of players: administrators/regulators, providers of services, and receivers of services).

These three interrelated elements, when administered within an agreed operating framework, deliver assurance to stakeholders – both to providers *and* receivers of products and services.

Policy area	Media and communications	Finance	Health	Energy	Intelligent Transport Systems (ITS)	
Outcome	To deliver a communication and media environment that balances the needs for industry and the Australian community with regulation, education and advice. (*ACMA website*)	To establish and enforce prudential standards and practices designed to ensure that, under all reasonable circumstances, financial promises made by institutions we supervise are met within a stable, efficient and competitive financial system (*APRA website*)	To regulate Australia's health practitioners, in the public interest (*AHPR website*)	To regulate the wholesale and retail energy markets, and energy networks (*AER website*)	A safe, secure, efficient, reliable and integrated national transport system that supports and enhances our nation's economic development and social and environmental well-being (*Policy Framework for ITS in Australia*)	
Responsible agency	Australian Communications and Media Authority (ACMA)	**Australian Prudential Regulation Authority (APRA)**	Australian Health Practitioner Regulation Agency (AHPRA)	Australian Energy Regulator (AER)	**In-vehicle ITS (telematics)** Transport Certification Australia (TCA)	**Road-side ITS** Road and transport agencies

Key instruments / activities	Legislation Regulations Standards Codes of practice Licensing (including class licences) Type-approvals Compliance management Administration and management of spectrum	Legislation Regulations Prudential standards Guidance notes Prudential practice guides Supervision of banks, building societies and credit unions, life and general insurance and reinsurance companies, friendly societies and super funds.	Legislation National Boards (for specific heath profession categories) Administration and management of the National Registration and Accreditation Scheme Accreditation standards, registration processes, legal agreements, audits, monitoring and compliance	Legislation Business rules Monitoring Investigation Reporting Compliance Assessing applications from businesses that want to become energy retailers.	Legislation Functional and technical specifications Certification Type-approvals Legal agreements Administration and management of telematics services Application of business rules, performance standards, audits, monitoring and compliance	
Examples of operating framework/s	Digital radio regulatory and licensing framework Spectrum licensing technical framework	Authorised Deposit-taking Institutions (ADIs) Prudential Framework General Insurance Prudential Framework Superannuation Prudential Framework Private Health Insurance Prudential Framework Cross Industry Prudential Framework	Quality Framework for Accreditation Audit framework for nursing and midwifery	National Energy Framework	*National Telematics Framework*	

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