Request for Comment

On-board Vehicle Mass-Monitoring

March 2007

Transport Certification Australia

www.tca.gov.au

Introduction

Transport Certification Australia Limited (TCA) is looking in the medium-term to add a new parameter to the Intelligent Access Program (IAP), allowing for the capture of vehicle mass information. This parameter will go beyond the self-declaration function that will be available when the IAP commences operation – allowing the mass of the vehicle to be automatically recorded rather than declared by the transport operator or their nominated representative.

TCA certifies IAP Service Providers and administers the IAP. The actual establishment and operation of IAP Applications is managed by jurisdictions (road transport authorities). TCA is in effect the 'wholesaler' of the IAP, and the jurisdictions are the 'retailers', who apply the IAP to support their transport policies.

The TCA Board of Directors endorsed a number of strategic initiatives for this financial year (see TCA's 2006/2007 Statement of Corporate Intent). TCA committed to working jointly with the National Transport Commission (NTC) to investigate the feasibility of on-board vehicle mass-monitoring devices for IAP.

The availability of an on-board vehicle mass-monitoring parameter will ultimately benefit the transport industry and jurisdictions as it would provide greater functionality to the IAP, which in turn will increase the range of IAP Applications and uses that can be implemented.

Transport operators should not simply wait on jurisdictions to identify uses of the IAP. The IAP provides an excellent means of negotiating improved access to the road network and demonstrating compliance with the conditions of that access. The inclusion of an on-board vehicle mass-monitoring parameter would ultimately add to the negotiating power of the IAP.

TCA intends that the new parameter be simple to implement and use, and at the same time address the requirements of IAP Applications. Ultimately, based on the feasibility of the parameter, TCA would update the IAP Functional and Technical Specification, IAP guidelines and other documents to incorporate this vehicle mass parameter.

Before this work begins in earnest, TCA is seeking feedback and comments from the target audiences listed below to ensure that it understands how an on-board vehicle mass-monitoring parameter would operate in practise.

- The telematics industry,
- Developers and suppliers of both complete and partial on-board vehicle mass-monitoring solutions, and
- End-users of on-board vehicle mass-monitoring solutions – undertaking transport tasks on both private and public roads.

This document describes broadly how TCA anticipates the on-board vehicle mass-monitoring parameter would operate and poses a number of questions to the identified target audiences.

TCA would appreciate any feedback and comments by Friday 27 April 2007 to be sent to Mr Bob Peters (seconded from Main Roads – Western Australia) email:tca@tca.gov.au or telephone 0418 908 785.

Background

The on-board vehicle mass-monitoring parameter (OVMP) would be generic to IAP as a whole and would not be specific or 'hard-wired' to any particular IAP Application. At this stage it is envisaged the OVMP would support the following attributes:

- The individual mass of most or all axle groups in the total vehicle combination, and
- The operational status of the on-vehicle sub-system that calculates and reports axle group masses.

This OVMP information would be transferred to the TCA-certified in-vehicle unit (IVU) located in the prime-mover of the vehicle combination.

If OVMP is required by a specific IAP Application, the jurisdiction will inform the transport operator of what information is required and the business rules associated with the same. It is anticipated this would usually be undertaken via a jurisdictionally supplied IAP Application guideline or permit.

Description of the anticipated on-board vehicle mass-monitoring parameter

On-board vehicle mass-monitoring technology has been on the Australian market for a number of years. It is typically made up of two or three components.

1. Mass Sensors

   The mass sensors vary depending on the type of suspension on the vehicle axle group in question, but are essentially some form of transducer incorporated in the vehicle's suspension system to measure the mass of an individual axle or an entire axle group. For steel-sprung suspensions, this typically involves the use of load cells. For air-bag suspension, this typically involves the use of air pressure transducers in the air feed lines to the air-bags.

2. Electronic Buffers

   In some systems, the electrical signal from the transducer is feed into some form of electronic buffer (typically associated with an axle group or vehicle combination unit). This buffer may condition the incoming signal, combine/collate a number of incoming signals, convert an incoming analog signal to a digital format, store a number of readings, or even convert the signal into an actual mass value based on some pre-defined formula.

3. A display/control/interface unit

   Virtually all on-board vehicle mass-monitoring systems (OVMS) provide some form of interface that allows users to configure the system, read mass measurements from, and connect to other devices such as printers, wireless communications devices, etc. In some systems, this unit also performs the functions of electronic buffers.

For application within the IAP, an OVMS would need to:

- Record and report the individual mass, in kilograms, of most or all axle groups in the total vehicle combination. There may be applications where, for example, the steer axle does not need to be instrumented – this will be dependent on available and practicable technology and cost.
- Be able to report the unique identity of the measuring components used to determine an individual axle group to the degree that related mass readings are unambiguously distinguished from those of other axle groups.
- Be able to report on the 'health' of the system and any attempts to tamper with, relocate, or remove the system from the vehicle once appropriately installed. This requirement is not unlike that on the IVU under the IAP.
- Identify when the mass readings were of an evidentiary nature (higher order accuracy level) and under what conditions this occurs.

Likely business rules associated with the on-board vehicle mass-monitoring parameter

The interface between an OVMS and the IVU would be defined by a new TCA standard (see Request for Comment on prime-mover trailer interoperability standard). The OVMS itself will have to comply with a similar range of requirements as the IVU, for example:

- It will have to meet largely the same requirements relating to its suitability for use in a vehicle – this covers issues such as electromagnetic compatibility, the ability to cope with vibration, impacts, temperature, humidity, dust and water ingress.
- Individual components that directly influence the VMP will require a clearly visible unique identifier, and may also be required to contain that identifier in non-volatile programmable read-only memory and report it when transmitting of data.
- Though it is unlikely an OVMS would require the same level of sophistication in alarm recording and reporting as an IVU, an OVMS will likely need to monitor its own operational status and report the failure of, or attempts to tamper with or remove, components.

There will likely be three scenarios when VMP data is reported to the IVU for transmission on the IAP Service Provider:

- At a preset time interval (which is programmable by the IAP Service Provider),
- When polled for a VMP reading by the IVU, and
- When the driver initiates the recording of a VMP.

The VMP will have to identify in which scenario it was generated.

If a specific IAP Application requires utilisation of the VMP, then the transport operator will have installed in the relevant vehicle combination an IAP-compliant monitoring solution that incorporates VMP. For the transport operator this need will be identified as a condition of the IAP Application and specified in the jurisdictionally supplied guideline. Additionally, for an IAP Service Provider the requirement will be specified as part of the Intelligent Access Condition (i.e. electronic permit).

All VMP information is transmitted to the IAP Service Provider. However, VMP information is only sent to a Jurisdiction in the event of a non-compliance report being generated. A non-compliance report is generated if:

(i) the vehicle is non-compliant with the specified IAP conditions, and

(ii) An alarm related to the OVMS occurs.

A non-compliance report does not necessarily mean an offence. All non-compliance reports are assessed and it will be up to the relevant jurisdiction to decide what action to take, if any.

Questions to the various target audience

As well as general responses to this 'Request for Comment', there are a number of questions TCA specifically wants to pose to the various target audience as presented below.

1. To members of the telematics industry:
    a. What types of interface does your IVU accommodate for communicating with other devices? Do you have plans to accommodate new forms of device interface?
    b. What capacity does your IVU have for storing data from other devices? Do you have plans to change this storage capacity?
    c. What are the constraints on the connection of your IVU to other devices?
2. To developers and suppliers of OVMS:
    a. What is the reliability and accuracy of your OVMS? Please attempt to quantify this in either percentage of group or gross combination mass, or actual kilograms.
    b. Provide operational scenarios where your OVMS is most and least accurate/reliable.
    c. How many OVMS units do you currently have installed? How many customers of OVMS do you have and in what markets do they operate?
    d. What is your capacity to adapt your OVMS to suit new requirements?
    e. What is you capacity to supply OVMS units?
3. To end-users of OVMS:
    a. What uses/applications do you have for OVMS?
    b. What is your experience with the reliability and accuracy of OVMS? If possible, provide scenarios that make your response clear.
    c. In what situations have you found OVMS to be most useful? Most accurate? Please attempt to quantify this in either percentage of group or gross combination mass, or actual kilograms.
    d. In what situations have you found OVMS to be least useful? Least accurate? Please attempt to quantify this in either percentage of group or gross combination mass, or actual kilograms.

If a potential respondee is concerned with the disclosure of commercially or legally sensitive information, they are encouraged to contact TCA directly to discuss arrangements to manage the confidentiality of this information.

TCA welcomes comment from all and any other interested parties.

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