

Intelligent Speed Assist and the current market – cracking a tough nut

Healy, D., Truong, J., Cockfield, S.
Transport Accident Commission
Email: david_healy@tac.vic.gov.au

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Abstract

The safety benefits of the Intelligent Speed Assist (ISA) technology have been demonstrated in a number of studies in Australia (eg. TAC SafeCar project) and overseas (eg. Sweden, Denmark, The Netherlands, United Kingdoms). These safety benefits apply to both the active limiting and supportive versions of the technology, with the former linked to the larger reduction in road trauma. Despite the favourable outcomes of these studies, penetration of ISA into the market place has made little progress to date internationally and has been met with a number of difficulties. Barriers include the need for a current up to date speed limit database, the notion of a limiting system being too restrictive and 'big brother', and manufacturer reluctance to investigate and promote the technology. So what are the approaches to help ISA gain acceptance in the community? This paper will explore, with a view to bringing into focus, the steps that are likely to provide safety dividends.

Introduction

The relationship between speed and the incidence and severity of road crashes has long been recognised. Importantly, recent research has pointed to the linkage between small changes in average and individual travel speeds and significant changes in trauma outcomes (eg. Elvik, Christensen & Amundsen, 2004; UK DoT, 2005). Increasingly, technologies such as Intelligent Speed Assist (ISA) that are capable of moderating individual and potentially average travel speeds are viewed as playing a very influential future role in promoting speed compliance through either guidance or control.

The safety benefits of ISA technology have been demonstrated in a number of studies in Australia (TAC SafeCar project) and overseas including Sweden and the U.K. (see, for example, Swedish National Road Administration, 2002) and these benefits apply to both active and advisory systems, with the former linked to a greater estimated reduction in road trauma.

Despite the favourable outcomes of these studies, penetration of ISA into the market place has made limited progress to date internationally and there remains a number of challenges that need to be tackled to ensure significant progress in the future. This paper explores in the Victorian context the path being taken in developing commitment to this worthwhile safety technology, the most promising future market segments and the need to tailor the product to best advantage within each of these segments.

Context

The TAC SafeCar project conducted in collaboration with Monash University Accident Research Centre (MUARC) and Ford Australia (Regan et al., 2006) assessed the impact of several developing technologies working severally and separately in terms of vehicle safety performance. It showed that ISA, operating alone, reduced both average and 85th percentile speeds by up to 1.4 and 2.7 km/h respectively. Importantly, it also found that the proportion of time spent travelling at 5 km/h or more over the speed limit reduced by 57%.

International research has also shown very positive outcomes, For example, a UK ISA trial estimated if all vehicles were fitted with an active limiting ISA system, this could potentially reduce fatal crashes by up to 59% (Carsten & Tate, 2005).

Despite these favourable assessments, ISA technology is not one that has received strong impetus from within the vehicle manufacturing industry as a whole. This reluctance may well reflect a perceived conflict between marketing approaches - performance, power, acceleration rubbing up against a system that assists the driver to comply with speed limits. In the short to medium term, however, a number of after-market technology providers have helped to fill the vacuum by responding to government tender invitations or by going straight to market.

A brief description of the Victorian ISA demonstration project designed to help build a broad commitment to introduction of this technology within the vehicle fleet follows. Note that technical developments in respect of the ISA technology, the map database and the communications infrastructure are not the focus of this paper and only receive passing reference. They are nevertheless crucial in aiding the commercialisation of this product and its take-up by the relevant market segments.

Building commitment

An effective way to help build commitment longer-term to introducing a valuable technology or initiative in instances where knowledge of its potential is very limited is to demonstrate its value. This approach has been adopted, for example, in Sweden in a large scale, on road trial of ISA in four different cities (Swedish National Road Administration, 2002). Accordingly, the Transport Accident Commission (TAC) with the support of VicRoads embarked on an ISA Demonstration Project with the specific aims of:

- building understanding of the technology and its capability among decision-makers and a broad cross-section of the Victorian community;
- assessing its acceptability to users under a range of operational settings;
- signalling government interest in ISA to vehicle manufacturers and importers, after-market technology suppliers as well as to the mapping and communications industries;
- creating a community climate conducive to exploring and developing potential markets for the ISA technology; and
- creating an embryonic market for ISA technology.

The demonstration entails retro-fitting ISA systems progressively to the vehicles of a range of participants drawn from politics, executive management within the public and private sector, medicine and emergency services, local government, the transport sector and community.

The ISA device being demonstrated is an advisory unit only in which exceeding the speed limit by a set amount (eg 2 km/h) for greater than a pre-defined time interval (eg. 2 seconds) triggers activation of visual and auditory warnings. Other variants include supportive systems in which the accelerator pedal applies upward pressure (haptic feedback) and limiting systems in which choking back fuel enables the vehicle to stay within defined speed limits. Pre and post-questionnaires are administered to participants. To date, 36 participants have completed the demonstration with a further phase planned in which the trigger setting for the warnings will be varied with a view to monitoring changing levels of acceptability of the system by participants.

Encouragingly, momentum is building nationally with the Office of Road Safety in collaboration with Main Roads WA conducting a similar demonstration together with a trial of remote uploading of refreshed map information to ISA vehicles. Most recently, the Centre for Road Safety in NSW launched its ISA demonstration project in June 2008 involving 100 vehicles in the Illawarra region of the State. Importantly, the conduct of parallel projects in three states will allow differences in approach and device to be assessed in terms of user acceptability and reliability and functionality of the technology.

Developing markets for ISA

The nature of ISA technology is such that it is unlikely to lead, at least in the short to medium term, to broad community demand for fitment of the device either after-market or integrated within the manufacturing process. Those who conform to the speed limit may see little reason for seeking this technology, while those who willingly choose to adopt, at least on occasions, speeds in excess of the limit may hold a similar opinion but for different reasons! While the technology is likely to appeal to a conservative segment of the driving public, it is also likely that this segment may benefit least from fitment of ISA to their vehicle. They already subscribe to complying with speed limits and wish only for an aid to ensure that their behaviour conforms with their intention – a worthwhile reason for requesting an ISA system, nonetheless! For those who experienced the technology in the Victorian SafeCar project, though, about 45% agreed that ISA should be compulsory for all drivers, while 9% disagreed strongly with this statement (Regan *et al.*, 2006)

What opportunities exist, then, to best capitalise on the safety potential of ISA technology? What incentives exist that can help leverage penetration of ISA and within which market segments? A description follows of market segments which show potential.

Company fleets

This represents a potentially large market for introduction of ISA devices. It is estimated that approximately 30% of driver deaths arise during work-related travel, including travel to and from the workplace. The Occupational Health and Safety Act defines the vehicle as a workplace. Provisions of the Act in respect of employers showing a “duty of care” towards employees and ensuring that safety measures that are “reasonably practicable” are introduced create an environment conducive to introducing ISA systems in fleet vehicles.

The TAC together with WorkSafe Victoria have developed and now are promoting a set of guidance notes to assist companies with fleets of light passenger vehicles to adopt measures to best protect their employees, including choice of appropriately safe vehicles. Currently, both in this guidance note and in the TAC’s internal Vehicle Purchase Policy, speed assist technology is described as “desirable”. As ISA technology matures, however, and as demand helps to drive down costs through economies of scale, it is envisaged that the technology will become a recommended standard feature.

Within a fleet setting under the umbrella of an Occupational Health and Safety framework, it is anticipated that the ISA system can operate within quite stringent functional requirements - for example, either an advisory system with only a small threshold of 2km/h, say, over the limit before warnings are triggered or, subject to the availability of an accurate and readily up-dateable electronic map, a speed limiting ISA device.

Apart from the OH&S Act providing the necessary impetus for incorporating ISA technology within fleets, companies may also be swayed by considerations of reduced staff downtime, potentially lower vehicle maintenance, fuel and insurance costs, and for reasons of good corporate citizenship. Within the public sector, it will be important to prepare a business case to justify the inclusion of ISA within vehicle fleets by comparing costs of fitment with benefits that can be derived in terms of safety, operational cost savings and improvements to environmental amenity.

Recidivist speeders

In keeping with the introduction of alcohol ignition interlocks as a condition for the re-licensing of repeat drink-drivers, the court system could similarly stipulate the fitment of an ISA system as a necessary condition for a repeat speed offender to be re-licensed. A regulatory framework would enable this approach to be adopted.

It is envisaged that broad community support would accompany introduction of this re-licensing requirement for risky repeat offenders and that a limiting system, subject to the availability of accurate

electronic maps, would be the appropriate functionality. The technology would need to be, if not tamper-proof, at least tamper-evident, and subject to regular inspections during the prescribed period of fitment.

Preliminary discussions have commenced with the Sentencing Advisory Council of the Victorian Department of Justice with a view to exploring the potential for this technology to play a future influential role in the process of re-licensing recidivist speeding drivers.

Heavy vehicle operators

In Victoria, about 18% of road fatalities occur in crashes involving heavy vehicles, either rigid trucks or articulated vehicles. Importantly, it is predicted that the freight task, both via road and rail, will grow substantially over the next decade. Upward pressure on fuel prices together with a sharpened focus on the environmental impact of the transport sector provide the backdrop against which an increased demand for goods transport by road is being played out.

With fuel being the second largest cost to the transport operator, increasingly a focus is turning to speed management and eco-driving as a means of reducing costs associated with fuel usage, vehicle maintenance and insurance. Linfox has signalled its intention to review speed management practices in order to help secure its medium-term carbon emission reduction targets (Hopkins, 2008).

ISA as a technology can play an enabling role within an industry in which cost pressures may increasingly lead to a review of the business model under which transport companies operate. A small scale trial is currently underway in Victoria in which a transport company, Border Express, has fitted an ISA limiting device to a prime mover operating between Melbourne and Sydney. Similarly, Kenworth also has active speed limit systems on their new demonstration/innovation truck.

As for the light passenger fleet, the OH&S framework also provides an influential framework within the heavy vehicle industry to encourage the introduction of ISA systems to help promote sustainable speed management policies.

As the pressures on fuel costs, environmental amenity and business viability continue to mount, it is likely that the climate will become increasingly conducive to technology solutions such as ISA to promote a sustainable transport industry.

Community

In recent times in Victoria, speed limits in a number of places have changed in a bid to protect vulnerable road users such as young school children and pedestrians. As such, speed limits around shopping strips, school zones or in areas where there is high pedestrian activity have been lowered either permanently or on a time based criterion. As a result, motorists are likely to experience, on some parts of the traffic network, more frequent speed limit changes on the road. In this regard, the ISA technology could be helpful in assisting drivers to know the speed limit of the road they are travelling on and thus avoid fines through inadvertent speeding, particularly in jurisdictions with a strong enforcement regime.

Motorists need to be made aware of the technology and be educated about the safety benefits of ISA. Once there is awareness, motorists can be encouraged to request the technology at point of sale and thus create demand for the technology and provide the impetus for manufacturers to incorporate ISA as standard in their cars. The increased uptake for Electronic Stability Control (ESC) is a good example of how road safety agencies have used this market driven approach.

Bonus points in the Australasian New Car Assessment Program (ANCAP) for ISA systems can also provide extra incentive to manufacturers to incorporate ISA into their cars, and to buyers to purchase their vehicles.

Incorporating the ISA technology into existing technologies such as GPS navigation systems can potentially accelerate the uptake of the technology. This would reduce production costs and remove the need for an additional system.

The soon to be released BMW 7-series demonstrates the capacity of manufacturers to incorporate ISA like technology in their vehicles. The system in the 7-series is able to recognise the changing speed limits and displays this to the driver on the dash or windscreen.

The technology is envisaged to appeal to different segments of the community. For example, parents with young drivers may want to install an active limiting device in their children's car to prevent them from speeding while another segment of the community may want an advisory system only to warn them when they are speeding. The cost of the unit will obviously be a consideration, however, it is expected that, like all new technologies, competition and other market forces will eventually drive the cost down.

Conclusion

ISA as a technology has significant potential to moderate vehicle speeds and so reduce levels of serious trauma on our roads. While penetration of ISA systems have been modest to date internationally, key market segments are prospectively well-suited to adoption of this technology.

Through a process of demonstration, promotion and evaluation, the ground is being prepared for the introduction of ISA systems within market segments such as company fleets, heavy vehicle transport and the vehicles of multiple-speed offenders as a condition of re-licensing. The OH&S legislation together with pressures on business linked to fuel costs and environmental impact will be among the key driver for these.

The ISA development work conducted in Victoria will benefit greatly from the parallel developments in other Australian states arising from establishment of the Australasian Intelligent Speed Assist Initiative. It will also be important to ensure that the support infrastructure for ISA developed in Australia harmonises with international developments.

ISA technology shows significant safety potential. The rate at which it penetrates the market, however, hinges critically on two key streams of activity:

- the pace of development of an agreed communications platform together with map database accuracy and currency, and importantly
- how effectively the advantages of the ISA system to each of the key market segments are promoted.

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