

Intelligent Speed Assistance – Frequently Asked Questions¹

1. What is ISA?

Intelligent Speed Assistance (ISA) is the term given to a range of devices that assist drivers in choosing appropriate speeds and complying with speed limits. Intelligent Speed Assistance technologies bring speed limit information into the vehicle. Drivers receive the same information that they see (or sometimes miss seeing) on traffic signs through an onboard communication system, helping them to keep track of the legal speed limit all along their journey. Information regarding the speed limit for a given location is usually identified from an onboard digital map in the vehicle. Other systems use speed sign reading and recognition.

The information is then communicated to the driver in any of the following three ways: informing the driver of the limit (advisory ISA), warning them when they are driving faster than the limit (warning ISA) or actively aiding the driver to abide by the limit (assisting ISA).

All ISA systems that are currently being used in trials or deployment can be overridden if wished by the driver. In contrast to ISA, a speed limiter is a device used to limit the top speed of a vehicle. For some classes of vehicles in the EU they are a statutory requirement. Buses and coaches (M2 and M3 categories) are limited to maximum 100km/h, while heavy goods vehicles (N2 and N3 categories) are limited to maximum 90km/h.

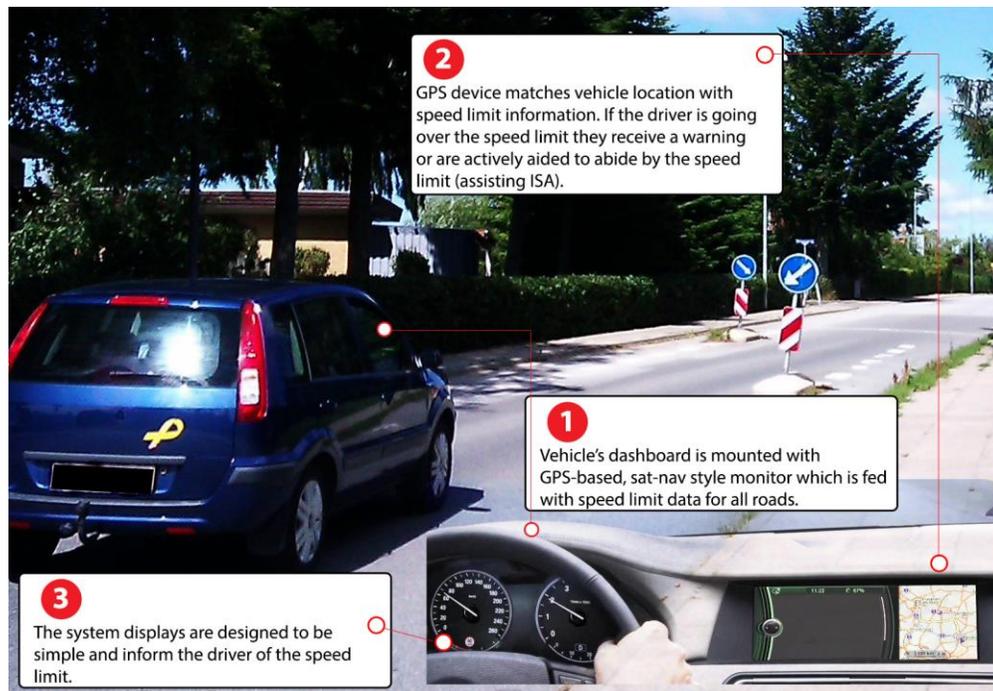


Figure 1 How ISA Works

¹ This is an updated version of ETSC's ISA Myths Policy Paper (2006) <http://etsc.eu/documents/ISA%20Myths.pdf>

2. What is the size of the speeding problem and how can ISA help?

Exceeding the legally set speed limit is widespread. The ETSC PIN report regularly evaluates road safety performance and found that, in countries where data on speed measurements in free-flowing traffic are available, up to 30% of drivers exceed speed limits on motorways, up to 70% on roads outside built-up areas and as many as 80% in urban areas². Even small reductions in speed can make a difference. For example, if average driving speeds dropped by only 1 km/h on all roads across the EU, more than 2,200 road deaths could be prevented each year, according to ETSC's calculations.

ETSC's PIN analysis also points out that these findings are in stark contrast with the drivers' self-reported behaviour. In the Sartre 3 survey carried out in 2002-2003 in 23 countries, drivers in all countries reported committing most violations on motorways and the fewest violations in built-up areas. The percentage of car drivers who reported breaking the speed limit 'often', 'very often' and 'always' in European countries on different road types was 28% on motorways, 19% on main roads between towns, 13% on country roads and 7% in built-up areas³.

ETSC analysed data related to the mean vehicle speed in free-flowing traffic, as well as the share of drivers exceeding the posted speed limit. Figure 3 shows that up to 30% of the drivers exceeded the speed limit on motorways in 2009⁴.

ISA can help to improve these high levels of non-compliance. Studies and trials undertaken in high performing countries (UK, NL, SE) show the positive effect of ISA on safety in these Member States⁵. ISA is likely to have an even greater impact on safety and reducing speeds in countries where speed compliance is lower.

² http://www.etsc.eu/documents/ETSC_2011_PIN_Report.PDF and <http://www.etsc.eu/documents/05.05%20-%20PIN%20Flash%2016.pdf>

³ <http://sartre.inrets.fr/documents-pdf/repS3V1E.pdf>

⁴ In some jurisdictions a distinction is made between the posted limit and an enforcement threshold (e.g., currently, in Great Britain, limit + 10% + 2 mph) such that a driver detected travelling at 30.1 – 34.9 mph will be counted as non-compliant with the speed limit in an urban 30mph zone but is not considered to warrant prosecution. Indeed UK figures show that typically below half of those exceeding the speed limit are exceeding the enforcement threshold.

⁵ Carsten O., Fowkes M., Lai F., Chorlton K., Jamson S., Tate F., & Simpkin B. (2008), ISA-UK intelligent speed adaptation Final Report.

Lai, F., Carsten, O., Tate, F. (2012) How much benefit does Intelligent Speed Adaptation deliver: An analysis of its potential contribution to safety and the Environment.

SWOV Intelligent Speed Assistance Factsheet: (2010) http://www.swov.nl/rapport/Factsheets/UK/FS_ISA_UK.pdf

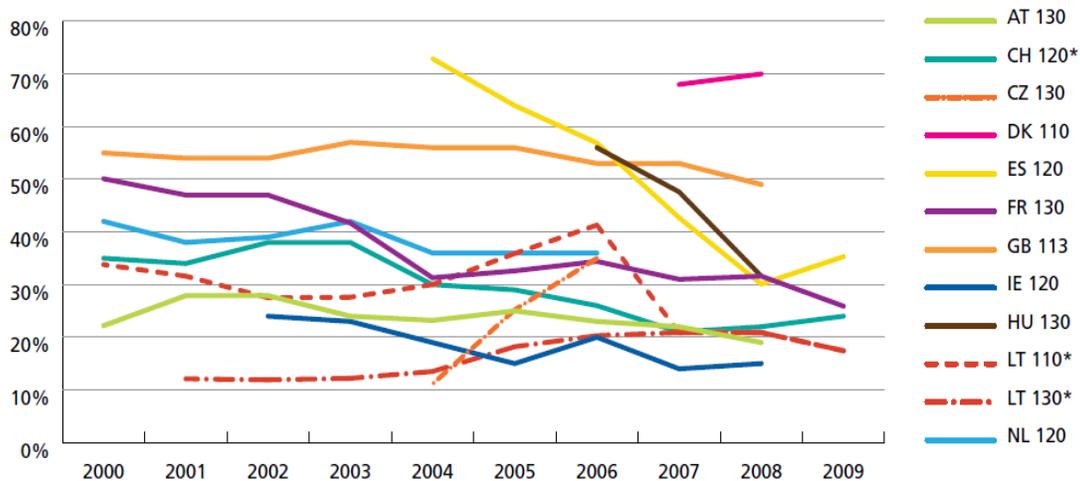


Figure 2 Percentage of cars and Light Commercial Vehicles⁶ (LCV's) exceeding the speed limits on motorways. *All traffic

Citizens across the EU have a right to know what the speed limit is at all times on all roads, for reasons of general information and specifically for reasons of road safety. There are currently sections of road where this is not clear. ISA also needs up-to-date speed information. One source of this are speed limit maps provided by public authorities.

ROSATTE was an EU funded project which aimed to establish an efficient and quality ensured data supply chain from public authorities to commercial map providers with regards to safety related road content and was completed in 2010. The work continued under the EU funded eMaPS which contributed to the establishment of an independent implementation platform promoting and extended the scope of the ROSATTE framework. A number of countries including Finland, Sweden and the Netherlands have both the speed limit map and procedures in place to keep this information updated and accessible.

The provision of such a digital database of all speed limits on the network is an important prerequisite for the implementation of ISA. ETSC advocates to the EU and public authorities that this should be taken up under the ITS Directive 2010/40/EU.

Motives for exceeding the speed limit are both rational and emotional and may depend on the temporary state of the driver or the actual situation⁷. The Sartre 3 survey⁸ reveal a variety of reasons around why people speed. These can be temporary (e.g. "I'm in a hurry"; "I didn't know the speed limit") or more permanent (e.g. "I'm more skilled than other drivers so can drive faster and still be safe"; "this car is designed to be safe when driven fast"). Moreover, three other common reasons may influence speeding behaviour: the type of vehicle driven, the posted speed limit and the perceived likelihood of enforcement.

⁶ LCV: goods vehicles with a gross vehicle mass of up to 3.5 tonnes.

⁷ ERSO (2007) Speeding.

⁸ <http://sartre.inrets.fr/documents-pdf/repS3V1E.pdf>

3. How far is ISA being deployed to date?

ISA is a mature technology that has substantial safety benefits and potential to reduce the consequences of most severe collisions.

ISA is steadily making its way into European vehicle fleets. A number of vehicle manufacturers already offer advisory ISA.

Moreover, many hand held navigation devices have advisory ISA applications, informing the driver about the correct speed limit. These two developments mean that drivers are becoming used to having this sort of information in the vehicle.

ISA systems have also been included as required safety requirement under public procurement laws in Sweden⁹. Currently there are approximately 2,000 ISA systems installed in Sweden, one-third in the Swedish Transport Administration's vehicle fleet¹⁰. Furthermore, several municipal administrations have equipped their vehicles with informative ISA. The local buses in Lund, for example, are equipped with an ISA system with auditory warning for the driver if they exceed the speed limit. In Sweden, ISA is also already used by several companies and approximately 60 local authorities, such as Stockholm and Västerås, on the basis of an informative system.

ISA has been extensively studied in Europe in large field tests. Over the last two decades field trials have been carried out in eleven European countries: Austria, Belgium, Denmark, Finland, France, Hungary, Netherlands, Norway, Spain, Sweden and the U.K.

⁹ Government Decree (2009:1) Environmental and Road Safety

¹⁰ <http://www.trafikverket.se/Foretag/Trafikera-och-transportera/Trafikera-vag/Sakerhet-pa-vag/ISA--Intelligent-stod-for-anpassning-av-hastighet/Leverantorer-och-anvandare/>

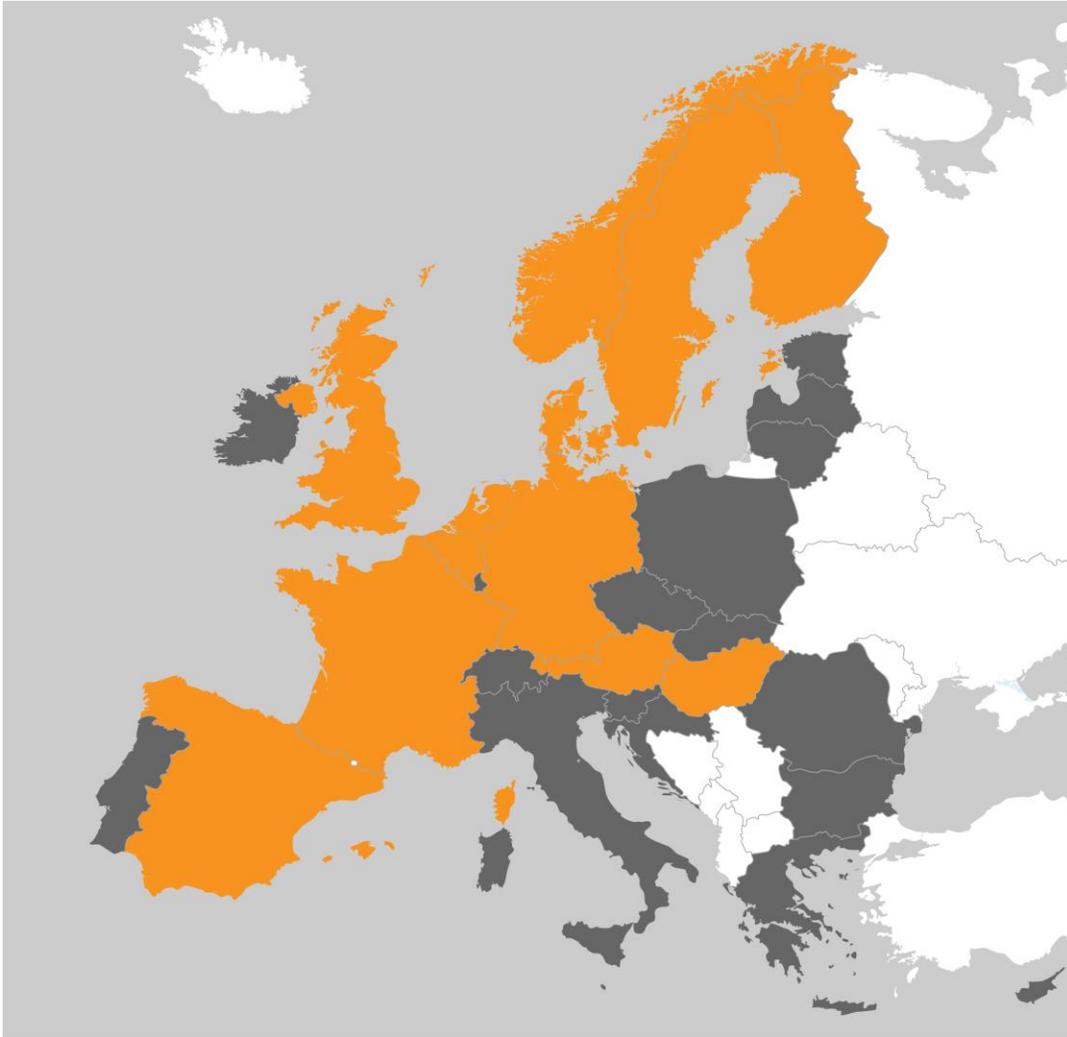


Figure 3 Map of countries where ISA field trials have been run.

The 2013 EuroNCAP – European New Car Assessment Programme – protocol awards points for cars which have speed management technologies installed, thus taking an important step in promoting the large-scale deployment of ISA in the future, cars will almost certainly need to have a speed assistance system fitted as standard in order to qualify for the coveted 5 star rating. EuroNCAP tests for two separate technologies: a Manual-set Speed Assist system, MSA (which was included in the 2009 EuroNCAP protocol as a Speed Limitation Device, SLD, system) and a Speed Limit Information Function, SLIF, which can be digital map-based, or camera-based, relying on traffic sign recognition, or a combination of the two. Coupling these technologies – the MSA and the SLIF – so that the driver can rely on his vehicle not to exceed the speed limit, would result in an effective ISA available in the vehicle.

Progress has been significant, showing the market penetration – and acceptance – of the technologies. In 2009, 73% of the car models tested had no SLD (MSA), 14.5% had it as an option on more than 85% of the variants of a model and 12.5% had it as standard equipment on all the variants of the model tested. By 2013, this figure has increased

substantially: 73.3% of the models tested have MSA (SLD) installed. However, up to now, only one model also had a map-based SLIF. This means that the demand for speed limit data will increase substantially from both consumers of safe vehicles and the vehicle manufacturers hoping to offer the service.

4. What are the advantages of ISA over Speed Limiters?

Speed limiters do not have the technically more advanced function to adapt the maximum speed to the prevailing legal speed limit, as does ISA. Speed limiters do nothing to reduce speeding on roads with speed limits below the Speed Limiter setting, including rural and especially urban roads.

5. What are the costs and safety benefits of ISA?

Research has found that gains substantially outweigh the costs of ISA implementation. The benefit-to-cost ratios predicted for six EU countries range from 2:1 to 4.8:1, taking into account a period of 45 years from 2005 to 2050, depending on the implementation scenario¹¹. If each country first encourages the use of supportive ISA and then mandates it for the remaining 10% of the car fleet (authority-driven scenario, 100% penetration by 2035), benefit-to-cost ratios of up to 4.8:1 can be expected. In these calculations, the cost of setting up and maintaining the speed limit databases has been included.

Recent research shows that the UK public would be willing to pay up to £100 for the technology to have it embedded in their car¹². Another major draw is that ISA would enable drivers to comply with the speed limit laws, no longer receiving speeding fines. Moreover it is expected that ISA will reduce the need for traditional police enforcement of speed limits and would also be more publicly acceptable than the rolling out of the safety camera network. ISA could also replace costly physical measures currently used to obtain speed compliance such as speed bumps. For example, the calculated cost of 20 mph zones with physical traffic calming features in London is approximately €70,000 per kilometre¹³.

A Swedish large-scale study of the effect of informative and supportive ISA, involving nearly 4,500 vehicles, shows that if everyone had informative ISA fitted, the number of injury collisions could be reduced by 20% in urban areas¹⁴. Supportive systems have even greater potential to reduce fatal and serious collisions. Estimates by Carsten¹⁵ show that ISA is predicted to save up to 28.9% of collisions on all roads (with 33% on urban roads

¹¹ Carsten O. (2005), PROSPER Results: Benefits and Costs. Presentation at the PROSPER Seminar on 23 November 2005 in Brussels.

¹² Lai F., Jamson S. and Carsten O. et al Lancashire ISA: The Effect of Advisory ISA on Driver's Choice of Speed and Attitudes to Speeding.

¹³ <http://www.tfl.gov.uk/assets/downloads/corporate/20-mph-zones-and-road-safety-in-london.pdf>

¹⁴ Biding, T. and Lind, G. (2002), Intelligent Speed Adaptation (ISA), Results of large-scale trials in Borlänge, Lidköping, Lund and Umeå during the period 1999–2000, Swedish National Road Administration, Publication 2002:89 E URL: <http://www.isa.vv.se/novo/fil/lib/pdf/isarapportengfinal.pdf> (2004-11-04).

¹⁵ Carsten O., Fowkes M., Lai F., Chorlton K., Jamson S., Tate F., & Simpkin B. (2008), ISA-UK intelligent speed adaptation Final Report.

and 18.1% on motorways)¹⁶. The impact of ISA is greatest on 30mph roads, which is logical because many of these crashes involve a collision with a pedestrian where vehicle speed strongly affects the risk of severe injury or fatality. On such roads ISA has the potential to prevent up to one-third of injury accidents¹⁷.

According to ETSC estimates, the human losses avoided stand at 1.88 million EUR for preventing one single road death in the EU. Alongside legal and moral obligations there is also a strong economic case to include the deployment of ISA on the EU's transport agenda.

6. What are the CO₂ and fuel economy benefits of ISA?

Transport is the only sector where greenhouse gas (GHG) emissions have almost continuously grown over the last 20 years and are now about one third above their 1990 levels. The contribution of the road sector to the GHG emissions of transport in 2008 was 71.3%. Both fuel consumption and carbon dioxide emissions depend on a vehicle's travelling speed. Managing driving speeds is therefore a very effective carbon abatement policy, as demonstrated by ETSC's Policy Paper "Managing Speed: Towards Safe and Sustainable Road Transport". Lower, and better enforced speed limits are 'one of the most certain, equitable, cost effective and potentially popular routes to a lower carbon economy'.

ISA can further contribute to improving compliance with speed limits. If drivers behave in a more energy-efficient way, this also helps to improve the traffic flow, reduces fluctuations and the risk of congestion and traffic collisions¹⁸. Carsten et al. (2001) demonstrated that, in the U.K., CO₂ emissions from cars using ISA could fall by 8%¹⁹. Additionally, eco-driving training programmes, which are aimed at reducing drivers' fuel consumption emphasise the role of maintaining a steady speed in order to reduce fuel consumption. In Germany, savings resulting from eco-driving go up to 30% more distance driven per year for the same amount of fuel used.²⁰ The use of ISA technologies would help drivers maintain a steady speed by preventing sudden decelerations occurring when the driver realises they are speeding.

7. How will ISA benefit pedestrians and cyclists?

¹⁶ Lai, F, Carsten, O., Tate, F. (2012) How much benefit does Intelligent Speed Adaptation deliver: An analysis of its potential contribution to safety and the Environment.

¹⁷ Ibid.

¹⁸ Schade, W and Rothengatter, W. (2011) *Economic Aspects of Sustainable Mobility*, European Parliament Policy Department.

<http://www.europarl.europa.eu/document/activities/cont/201111/20111118ATT31837/20111118ATT31837EN.pdf>

¹⁹ Carsten, O. & Tate, F. (2001). *External Vehicle Speed Control*. Executive summary of project results. Leeds, U.K.

²⁰ ETSC (2011) Driving for Work: Managing Speed. PRAISE Project

<http://www.etsc.eu/documents/PRAISE%20Thematic%20Report%208%20Driving%20for%20Work%20Managi ng%20Speed.pdf>

ISA would improve the safety of VRUs by increasing speed compliance, particularly in urban areas. In countries where data are available, in free-flowing traffic up to 80% of drivers exceed speed limits in urban areas²¹. According to ETSC's PIN figures in 2009, in the EU27, 4,910 pedestrians and 1,278 cyclists were killed in urban areas (out of 13,219 total road deaths in urban areas). Additionally more than half of the people seriously injured are pedestrians or other vulnerable road users involved in a collision in an urban area.

In 2011 the European Commission completed a study²² to assess the application areas and services of ITS which demonstrate maximum benefits for VRUs. ISA was identified as a high-priority application to benefit VRUs, scoring well on criteria such as life saving potential, technical maturity, cost-benefit analysis and potential to stimulate deployment in the short or medium term in the EU. The outcome of this work provides a foundation for potential work towards specifications under the ITS Directive.

8. Is the Public Opinion in favour of ISA?

Compliance with speed limits is generally poor, and speed limits are often exceeded with relatively little public disapproval of speeding. Drivers readily admit to exceeding the speed limit²³.

The SARTRE 3 survey²⁴ among drivers from 23 European countries has shown that a majority of drivers recognise the risks involved in driving too fast and support measures to reduce speeding. Depending on the country surveyed, between 39% and 80% of drivers said they were in favour of greater levels of speed enforcement. Overall, 60% of drivers supported more severe penalties for speeding, even though they felt much more likely to encounter speed enforcement than other types of checks²⁵.

The SARTRE 3 survey has also demonstrated that, across Europe, about 55% of drivers would find a system preventing them exceeding the speed limit "useful" or "very useful". Moreover, when drivers are given the opportunity to try ISA technologies the acceptance of the technology increases rather than decreases. Across Europe, between 60% and 75% of drivers who have tried out ISA technologies said they would like to have the system in their own cars²⁶. In all surveys advisory and supportive systems (e.g. with an 'active accelerator' or 'beep' warning) achieved the highest scores. In Sweden, where more than 10,000 people have tested ISA, one in three test drivers would have been prepared to buy the so-called 'active accelerator' ISA, and one in two would have been ready to pay for a sound warning system²⁷.

²¹ ETSC (2010), 4th Annual PIN Report.

²² ITS Action Plan Safety and Comfort of the VRU TREN/G4/FV2008/475/01

http://ec.europa.eu/transport/themes/its/studies/doc/2011_05-safety-and-comfort-vulnerable-road-user.pdf

²³ Sartre 4 2012.

²⁴ Sartre 3 2004.

²⁵ Ibid.

²⁶ Peltola H. and Tapio J.R. (2004), Intelligent Speed Adaptation – recording ISA in Finland. Presentation at the Via Nordica 2004 Conference on 7-10 June 2004 in Copenhagen, Denmark.

²⁷ Vagverket 2002 Swedish Road Administration Results of the World's Largest ISA Trial. Börlange, Sweden

The 2012 Sartre questionnaire showed that the public acceptability of the devices is high within Europe. In-vehicle speed limiters were approved by 78% of road users, 64% of Car Drivers and 50% of Motorcyclists.²⁸

In 2012 a European Commission consultation asked stakeholders on the option of introducing ISA to commercial vehicles. Five out of the 35 governmental respondents and 82% of the stakeholders answered that the ISA system should be introduced to all commercial vehicles. Out of the three types of ISA, 33% of Member States prefer informative ISA, 50% the supportive type and 17% would opt for either of the two. Overall the stakeholders show rather positive attitudes towards the introduction of ISA for commercial vehicles with 72% of them agreeing with the informative type, 89% with the supportive and 56% with the mandatory ISA.

This shows that it is only a vocal minority that continue to put the safety of the majority at risk by claiming that speed is unimportant, that drivers should be free to judge what speed is safe or that motorists do not support speed limits. There is actually a majority support for ISA technologies.

9. Is liability a problem?

ISA technologies intervene in the driving task to a varying degree. With most types, the intervention is no more than what drivers currently encounter from devices such as ABS, ESP, lane keeping support, cruise control, distance warning, etc. Many of the handling and engine management packages currently on offer intervene in some way between the driver and the controls of the vehicle. With all these devices, the driver still remains in control of the driving task. This is also the case with ISA technologies. The clarification of product liability will not be problematic, certainly not more problematic than for those technologies that are currently promoted in the market place²⁹.

The EU's ITS Action Plan³⁰ adopted in 2008 includes an action to address liability issues pertaining to the use of ITS applications and notably in-vehicle safety systems.

10. What has the EU done so far?

The European Commission's Road Safety Policy Orientations 2011-2020 recognised that: *" Technological developments, such as in-vehicle systems providing real-time information on prevailing speed limits could contribute to improve speed enforcement. "*

This was followed by the 2011 European Parliament Report on Road Safety which: *" Calls on the Commission to draw up a proposal to fit vehicles with 'intelligent speed assistance*

²⁸ Sartre 4 Report, page 333.

²⁹ Albrecht states that in Germany legal consequences are acceptable for all types of overridable ISA. Even though product liability is partly on the producer, automobile manufacturers are likely to include a disclaimer in their manual. Also it will be hard for costumers to prove that the damage has been caused by system failure (Albrecht 2005:18).

³⁰ ITS Action Plan (2008).

systems' which incorporate a timetable, details of an approval procedure and a description of the requisite road infrastructure".

The European Commission's Transport White Paper reiterated that it would work to *"Harmonise and deploy road safety technologies such as (...) (smart) speed limiters"*. In response to a Parliamentary Question in April 2012, posed by Ines Ayala Sender MEP, the European Commission affirmed that *"the ITS Directive provides the legal framework for the deployment and use of ITS applications, including ISA systems. Road safety and security applications are one of the priority areas of the directive, which, in this area, provides for the definition of measures to integrate advanced driver support information system."*

Finally a new Study³¹ has been published focusing on the safety benefits of speed limiters and ISA. It also includes the results of a survey aimed at assessing opinions at the European level. The general purpose is to provide the European Commission with an evaluation of road safety effects of the application of the Speed Limitation Devices Directive (2002/85/EC) to commercial vehicles, particularly of category M2 and N2 with maximum mass exceeding 3.5 tonnes but not exceeding 7.5 tonnes. It also considers whether and how the Directive should be amended to improve its effects and efficiency.

The main policy recommendations of this study are:

- *to keep the current obligation of speed limiters for HCVs and to keep the level of the maximum speeds of the speed limiters at the current levels;*
- *to further explore options for improving the effectiveness of the Speed Limitation Directive, in particular by:*
- *requiring all commercial vehicles to be equipped with a 'voluntary' type of ISA (i.e. that provides tactile feedback to the driver);*
- *requiring speed limiters for LCVs (N1 vehicles and possibly also a subset of M1 vehicles, see next bullet);*
- *to investigate how commercially used M1 vehicles could be covered by the legislation and what vehicle parameters could be used to distinguish them from other M1 vehicles;*
- *Ex-post evaluation on the installation and use of speed limitation devices; to further investigate options for including all or subsets of N1 vehicles, and in the case of subsets of N1 vehicles, to investigate how such a subset could be defined;*
- *to set up a monitoring system for analysing the impacts of (amendments of) the Speed Limitation Directive.*

11. What does ETSC hope that the EC will do?

Legislation for the deployment of ISA should come as soon as possible as one of the measures needed towards reaching the EU's 2020 road safety target. ETSC supports a step-wise approach, first extending ISA to commercial vehicles through type approval, followed by, in line with ISA development, "assisting" ISA fitted eventually universally through type approval in all vehicles.

³¹ http://ec.europa.eu/transport/road_safety/pdf/vehicles/speed_limitation_evaluation_en.pdf